MINERALS YEARBOOK

1961

Volume II of Three Volumes

FUELS

U. S. DEPARTMENT OF THE INTERIOR
March 3, 1849

Prepared by the staff of the

BUREAU OF MINES

DIVISION OF PETROLEUM
DIVISION OF BITUMINOUS COAL
DIVISION OF ANTHRACITE

UNITED STATES DEPARTMENT OF THE INTERIOR

STEWART L. UDALL, Secretary

BUREAU OF MINES

MARLING J. ANKENY, *Director*

OFFICE OF THE DIRECTOR:

PAUL ZINNER, *Assistant Director—Programs*
JAMES WESTFIELD, *Assistant Director—Health and Safety*
HENRY P. WHEELER, JR., *Assistant Director—Helium*
CHARLES H. JOHNSON, *Executive Assistant for Mineral Resources*
PAUL T. ALLSMAN, *Chief Mining Engineer*
JOE B. ROSENBAUM, *Chief Metallurgist*
J. WADE WATKINS, *Chief Petroleum Engineer*
LOUIS L. NEWMAN, *Chief Coal Technologist*
JOHN E. CRAWFORD, *Chief Nuclear Engineer*
WILLIAM A. VOGELY, *Chief Economist*
REXFORD C. PARMELEE, *Chief Statistician*
ALLAN SHERMAN, *Chief, Office of Mineral Reports*

DIVISIONS:

CHARLES W. MERRILL, *Chief, Division of Minerals*
T. REED SCOLLON, *Chief, Division of Bituminous Coal*
JOSEPH A. CORGAN, *Chief, Division of Anthracite*
CARL C. ANDERSON, *Chief, Division of Petroleum*
ELMER W. PEHRSON, *Chief, Division of Foreign Activities*
W. E. RICE, *Chief, Division of Administration*

REGIONAL OFFICES:

MARK L. WRIGHT, *Regional Director, Region I, Albany, Oreg.*
R. B. MAURER, *Regional Director, Region II, San Francisco, Calif.*
R. W. GEEHAN, *Regional Director, Region III, Denver, Colo.*
ROBERT S. SANFORD, *Acting Regional Director, Region IV, Bartlesville, Okla.*
A. L. JULIAN, JR., *Acting Regional Director, Region V, Pittsburgh, Pa.*

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1962

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington 25, D.C.—Price $2.50 (Cloth)

Engineering
ML
.7UN3
MI
1961
2

1329162

FOREWORD

MINERALS YEARBOOK, 1961, published in three volumes provides a record of performance of the Nation's mineral industries during the year, with enough background information to interpret the year's developments.

The three-volume issues of the Yearbook follow this pattern:

Volume I includes chapters on metal and nonmetal mineral commodities except mineral fuels. In addition, it contains a chapter reviewing these mineral industries, a statistical summary, and chapters on mining and metallurgical technology, employment and injuries, and technologic trends. The chapter on High-Purity Silicon, new in the 1960 volume, has been renamed Silicon. This chapter has been enlarged to incorporate data on metallurgical silicon and its alloys with iron. Also, an additional chapter in the 1961 volume I compares Bureau of Mines mineral-commodity production data for 1958 with those presented in the 1958 Census of Mineral Industry reports published by the United States Department of Commerce.

Volume II includes chapters on each mineral fuel, an employment and injuries presentation, and a mineral-fuels review chapter that summarizes development in the fuel industries.

Volume III contains chapters covering each of the 50 States, plus chapters on island possessions in the Pacific Ocean and the Commonwealth of Puerto Rico and island possessions in the Caribbean Sea, including the Canal Zone. Volume III also has a statistical summary chapter, identical with that in Volume I, and a chapter on employment and injuries.

Figures in the Minerals Yearbook are based largely upon information supplied by mineral producers, processors, and users, and acknowledgment is made of this indispensable cooperation given by industry. Information obtained from individuals through confidential surveys has been grouped to provide statistical aggregates. Data on individual producers are presented only if available from published or other nonconfidential sources, or when permission of the individuals concerned has been granted.

MARLING J. ANKENY, *Director*

ACKNOWLEDGMENTS

The chapters in this volume of the MINERALS YEARBOOK were prepared by the staffs of several divisions in the Bureau. Those on bituminous coal and its products were prepared under the general supervision of T. Reed Scollon, chief, Division of Bituminous Coal, and T. W. Hunter, chief, Branch of Bituminous-Coal Economics and Statistics; the chapters on petroleum and related commodities were prepared under the general supervision of C. C. Anderson, chief, Division of Petroleum, and D. S. Colby, chief, Branch of Petroleum Economics; the anthracite chapter was prepared under the general direction of Joseph A. Corgan, chief, Division of Anthracite; the helium chapter was prepared under the direction of Henry P. Wheeler, Jr., Assistant Director—Helium. Preparation of this volume was coordinated by William C. Elliott, Jr., Executive Assistant to the Chief, Division of Petroleum, and Thelma K. Stewart, editorial assistant.

Because of the many sources of data presented, the Bureau cannot credit each individually, but acknowledgment is made of the splendid cooperation of producers and users of fuels who supplied information and of the business press, trade associations, scientific journals, international organizations, and State and Federal agencies. The Bureau of the Census, U.S. Department of Commerce, furnished data on foreign trade from which the import and export tables in these chapters were compiled by the Bureau of Mines under the direction of M. B. Price, assisted by E. D. Page. World production tables were compiled under the direction of Berenice B. Mitchell from many sources including data from the U.S. Foreign Service, Department of State.

The mining and geology and related departments of the respective States have been most cooperative and have made available supplementary and verifying information regarding production and plant operations. For their assistance the Bureau is deeply grateful, and acknowledgment is made to the following State organizations that assisted with the canvasses of bituminous coal and lignite:

Alabama: Division of Safety and Inspection, Birmingham.
Alaska: Department of Natural Resources, Division of Mines and Minerals, Juneau.
Arizona: State mine inspector, Phoenix.
Arkansas: State mine inspector, Fort Smith.
Colorado: Colorado Coal Mine Inspection Department, Denver.
Georgia: Department of Mines, Mining, and Geology, State Division of Conservation, Atlanta.
Illinois: State Department of Mines and Minerals, Springfield.
Indiana: Bureau of Mines, Terre Haute.
Iowa: State mine inspectors, Des Moines.
Kansas: State Mine Inspection Division, Pittsburg.
Kentucky: Kentucky Department of Mines and Minerals, Lexington.
Maryland: Maryland Bureau of Mines, Westernport.
Missouri: Division of Mine Inspection, Jefferson City.

New Mexico: State inspector of mines, Albuquerque.
North Dakota: State coal-mine inspector, Bismarck.
Ohio: Division of Mines and Mining, Ohio Department of Industrial Relations, Columbus.
Oklahoma: Chief mine inspector, Oklahoma City.
Pennsylvania: Pennsylvania Department of Mines and Mineral Industries, Harrisburg.
Tennessee: Tennessee Division of Mines, Knoxville.
Utah: Safety Division, Industrial Commission of Utah, Salt Lake City.
Virginia: Division of Mines, Virginia Department of Labor and Industry, Big Stone Gap.
Washington: Chief coal-mine inspector, Department of Labor and Industries, Seattle.
West Virginia: West Virginia Department of Mines, Charleston.
Wyoming: State coal-mine inspector, Rock Springs.

Appreciation is also expressed to the Commonwealth of Pennsylvania Department of Mines and Mineral Industries, Harrisburg, and Commonwealth of Massachusetts, Division on Necessaries of Life, Boston, for assistance in acquiring data on anthracite and to the following for their assistance with the peat canvass:

Michigan: Department of Conservation, Lansing.
New Jersey: Department of Conservation and Economic Development, Bureau of Geology and Topography, Trenton.
Washington: Department of Conservation and Development, Olympia.

Credit is also due the following State organizations that assisted with the petroleum and natural gas canvasses:

Arkansas: Arkansas Oil and Gas Commission, El Dorado. Department of Revenue, Little Rock.
California: California Department of Natural Resources, San Francisco. Public Utilities Commission, State of California, San Francisco.
Illinois: Oil and Gas Division and State Geological Survey Division, Urbana.
Kansas: Conservation Division, State Corporation Commission, Wichita. State Geological Survey, University of Kansas, Lawrence.
Louisiana: Louisiana Department of Conservation, Baton Rouge.
Maryland: Department of Geology, Mines, and Water Resources, Baltimore.
Michigan: Geological Survey Division, Department of Conservation, Lansing.
Mississippi: Mississippi, State Oil and Gas Board, Jackson. Oil and Gas Severance Tax Division, Mississippi State Tax Commission, Jackson.
Missouri: Division of Geological Survey and Water Resources, Department of Business and Administration, Rolla. Geological Survey and Water Resources, Rolla.
New York: New York State Science Service, Albany.
North Dakota: North Dakota, Geological Survey, Grand Forks.
Ohio: Oil and Gas Section, Department of Natural Resources, Columbus.
Oklahoma: Oil and Gas Conservation Department, Oklahoma Corporation Commission, Oklahoma City. Gross Production Tax Department, Oklahoma Tax Commission, Oklahoma City.
Tennessee: Division of Geology, Department of Conservation, Nashville.
Texas: Oil and Gas Division, Railroad Commission of Texas, Austin. Oil and Gas Division, State Comptroller of Public Accounts, Austin.
Virginia: Geological Survey Division, Department of Conservation and Development, Charlottesville.
West Virginia: Geological and Economic Survey, Morgantown.

Grateful acknowledgment is made to the American Iron and Steel Institute, New York, N.Y.; the Anthracite Institute, Wilkes-Barre, Pa.; the Association of American Railroads, Washington, D.C.; the Upper Lake Docks Coal Bureau, Inc., St. Paul, Minn.; the Ore and Coal Exchange, Cleveland, Ohio; the National Association of Packaged Fuel Manufacturers, Topeka, Kans.; and the many other trade and industry associations that have provided data.

CONTENTS

Page

Foreword, by Marling J. Ankeny III

Acknowledgments V

Part I. General Reviews:

- Review of the mineral-fuel industries in 1961, by Robert E. Johnson, Jr., and T. W. Hunter 1
- Employment and injuries in the fuel industries, by John C. Machisak 47

Part II. Commodity Reviews:

- A. Coal and related products:
  - Coal—bituminous and lignite, by W. H. Young, R. L. Anderson, and E. M. Hall 53
  - Coal—Pennsylvania anthracite, by Forrest T. Moyer, James A. Vaughan, and Marian I. Cooke 159
  - Coke and Coal chemicals, by J. A. DeCarlo, T. W. Hunter, and Maxine M. Otero 203
  - Fuel briquets and packaged fuel, by Eugene T. Sheridan and Virginia C. Berté 265
  - Peat, by Eugene T. Sheridan and Virginia C. Berté 283
- B. Petroleum and related products:
  - Carbon black, by Ivan F. Avery and Lulie V. Harvey 301
  - Natural Gas, by Ivan F. Avery and Lulie V. Harvey 313
  - Natural gas liquids, by I. F. Avery, W. G. Messner, B. D. Furgang, and E. R. Eliff 333
  - Crude petroleum and petroleum products, by James G. Kirby, Walter G. Messner, and Betty M. Moore 357
- C. Helium:
  - Helium, by Harold W. Lipper 487

Part III. Appendix:

- Tables of measurement 493

Index 495

PART I. GENERAL REVIEWS

Review of the Mineral-Fuel Industries in 1961

By Robert E. Johnson, Jr.[1] and T. W. Hunter[2]

◆

Contents

	Page		Page
General summary	1	Distribution of bituminous coal and lignite	34
Domestic production	2	Government activities	38
Consumption	8	World review	38
Stocks	13	Comparison of Bureau of Mines and Bureau of the Census 1958 Data—Mineral Fuels Production	43
Labor and productivity	14		
Prices and costs	20		
Income and investment	29		
Research and development	31		
Transportation	32		

GENERAL SUMMARY

THE MILDEST recession of the postwar period ended in the first months of 1961, and the economy climbed steadily during the remainder of the year. The Federal Reserve Board (FRB) Index of Industrial Production climbed from a low point of 102 (1957=100) in February to 115 in December, a rise of 12.5 percent. But economic activity for the year as a whole was only 1.5 percent higher than the 1960 level, as measured by real gross national product (GNP). Although activity increased throughout 1961, much of it was merely regaining ground lost in the decline during the second half of 1960 and the first months of 1961. The FRB index did not regain the July 1960 high of 110 until June of 1961.

Mineral fuels did not fully share in the economic recovery. The (FRB) crude oil and natural gas index rose only 5 percent between February and December. Although the index of monthly coal production increased 11.5 percent during the year, the February level was so low that total production for the year was the lowest since 1954. Total production of energy measured in Btu's was up slightly (1 percent) during the year. Coal production was down; production of crude oil and natural gas was up. Calculated consumption paralleled production—total up slightly, coal lower, and crude oil and natural gas higher. The most interesting product developments were in coke and residual fuel oil. Sales of coke showed a sharper drop than steel production, coke's principal consumer. Sales of residual decreased for the third consecutive year. Stocks of petroleum and crude increased significantly during the year and reached their highest level since 1957.

---

[1] Minerals economist.
[2] Chief, Branch of Bituminous Coal Economics and Statistics.

Employment in all segments of mineral-fuel mining and related manufacturing industries showed a year-to-year decline. Earnings showed little change except in petroleum refining, where average hourly earnings increased 4.5 percent from the previous year. Labor productivity again increased in the coal industry. With few exceptions, prices of products and crude fuels were stable. The index of wholesale price of gas was up 2 percent, whereas the value of gas at the wellhead rose almost 8 percent. Residual fuel oil prices were up about 4.5 percent during the year. The wholesale price index for petroleum products climbed more than 1.5 percent, with distillate fuel oil showing more than a 6-percent increase. The Bureau of Labor Statistics (BLS) study of fringe benefits in mining found that supplementary benefits paid by the bituminous coal industry amount to one-third of the industry's straight-time payroll. More than half these benefits are in the form of payments to the welfare fund.

U.S. mineral-fuel exports held steady during the year, while imports advanced about 5 percent. The import rise was concentrated in crude and fuel oil. World prices continued their downward tendency.

Several new tables of interest appear in this chapter this year. Table 10 gives projections of demand in 1975 for the individual fuels and total energy. Table 17 is a new index of implicit unit value. BLS wholesale price indexes for various types of mining machinery are presented in table 23. Tables 25 and 26 cover the fringe benefits granted to mining labor. Table 31 shows research and development information. In the world review section, table 41 shows world production of coal and crude oil by region, and table 43 compares European and U.S. energy consumption by type of fuel. Table 40 has been revised to show U.S. apparent consumption of individual fuels as a percentage of world production, in addition to the comparison of world and U.S. production.

DOMESTIC PRODUCTION

Changes in the domestic production of fuels and energy may be measured in several ways. Table 1 summarizes the total energy production from mineral fuels and waterpower in the United States in terms of British thermal unit (Btu) content of the various sources (see also figs. 1 and 2). The values of mineral-fuel production are summarized in table 2, and the actual physical volume of production in the usual physical units used for each commodity, with values, is given in table 3. Finally, indexes of physical volume of production, weighted by values, are listed in tables 4 and 5. Since these measures are directed to different aspects of the fuels industries, it is not surprising that these measures sometimes move disparately. Total energy production, measured in Btu's, was 1.1 percent higher than in 1960. Actual physical quantities (Btu) of production showed three increases and two decreases. The value of mineral-fuel production increased by $106 million, a 0.5-percent increase. The Bureau of

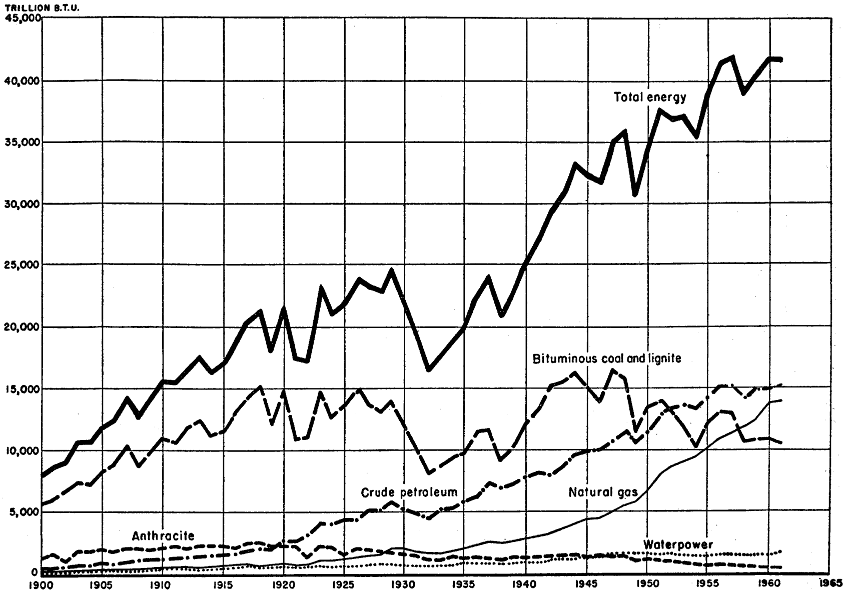

FIGURE 1.—Production of mineral-energy fuels and energy from waterpower in continental United States, 1900–61.

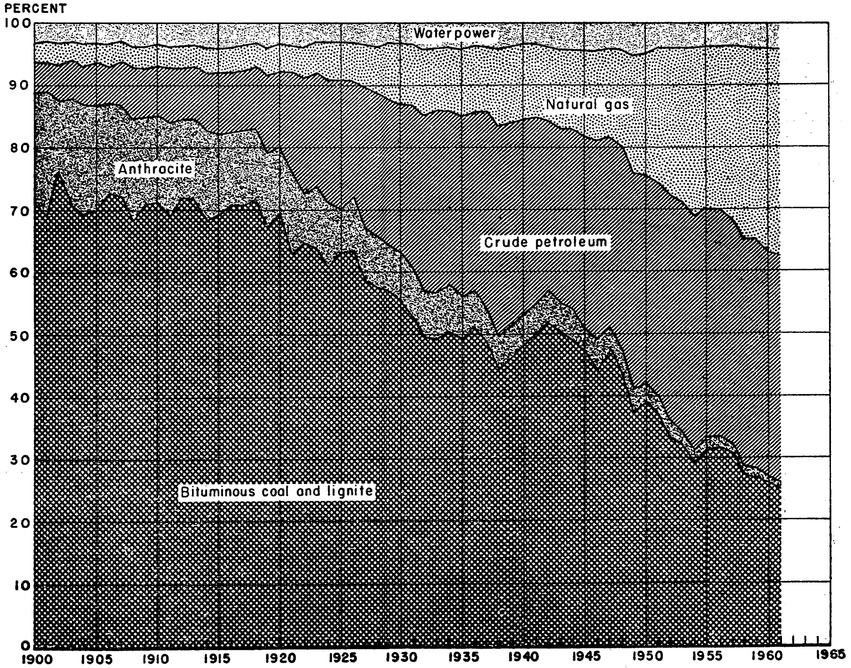

FIGURE 2.—Percentage of total production of British thermal units equivalent of mineral-energy fuels and energy from waterpower in continental United States, 1900–61.

TABLE 1.—Production of mineral energy fuels and energy from waterpower in trillion British thermal units and percentage contributed by each in the United States [1]

Year	Bituminous coal and lignite [2]	Anthracite	Crude petroleum	Natural gas, wet	Water power	Grand total	Percentage					
							Bituminous coal and lignite	Anthracite	Crude petroleum	Natural gas, wet	Water-power	Total
1900	5, 563	1, 457	369	254	250	7, 893	70. 5	18. 4	4. 7	3. 2	3. 2	100. 0
1905	8, 255	1, 973	781	377	386	11. 772	70. 1	16. 8	6. 6	3. 2	3. 3	100. 0
1910	10, 928	2, 146	1, 215	547	539	15, 375	71. 1	14. 0	7. 9	3. 5	3. 5	100. 0
1915	11, 597	2, 260	1, 630	676	659	16, 822	69. 0	13. 4	9. 7	4. 0	3. 9	100. 0
1920	14, 899	2, 276	2, 569	883	738	21, 365	69. 7	10. 7	12. 0	4. 1	3. 5	100. 0
1921	10, 897	2, 298	2, 739	732	620	17, 286	63. 0	13. 3	15. 9	4. 2	3. 6	100. 0
1922	11, 063	1, 389	3, 234	843	643	17, 172	64. 5	8. 1	18. 8	4. 9	3. 7	100. 0
1923	14, 792	2, 371	4, 248	1, 113	685	23, 209	63. 7	10. 2	18. 3	4. 8	3. 0	100. 0
1924	12, 672	2, 233	4, 141	1, 263	648	20, 957	60. 5	10. 6	19. 8	6. 0	3. 1	100. 0
1925	13, 625	1, 570	4, 430	1, 314	668	21, 607	63. 1	7. 2	20. 5	6. 1	3. 1	100. 0
1926	15. 020	2, 145	4, 471	1, 452	728	23, 816	63. 1	9. 0	18. 8	6. 1	3. 0	100. 0
1927	13, 565	2, 034	5, 227	1, 598	776	23, 200	58. 5	8. 8	22. 5	6. 9	3. 3	100. 0
1928	13, 120	1, 914	5, 229	1, 734	854	22, 851	57. 4	8. 4	22. 9	7. 6	3. 7	100. 0
1929	14, 017	1, 875	5, 842	2, 118	816	24, 668	56. 8	7. 6	23. 7	8. 6	3. 3	100. 0
1930	12, 249	1, 762	5, 208	2, 148	752	22, 119	55. 4	8. 0	23. 5	9. 7	3. 4	100. 0
1931	10, 011	1, 515	4, 936	1, 869	668	18, 999	52. 7	8. 0	26. 0	9. 8	3. 5	100. 0
1932	8, 114	1, 266	4, 554	1, 729	713	16, 376	49. 5	7. 7	27. 8	10. 6	4. 4	100. 0
1933	8, 741	1, 258	5, 253	1, 733	711	17, 696	49. 4	7. 1	29. 7	9. 8	4. 0	100. 0
1934	9, 415	1, 452	5, 267	1, 970	698	18, 802	50. 1	7. 7	28. 0	10. 5	3. 7	100. 0
1935	9, 756	1, 325	5, 780	2, 136	806	19, 803	49. 2	6. 7	29. 2	10. 8	4. 1	100. 0
1936	11, 504	1, 386	6, 378	2, 411	812	22, 491	51. 2	6. 1	28. 4	10. 7	3. 6	100. 0
1937	11, 673	1, 317	7, 419	2, 684	871	23, 964	48. 7	5. 5	31. 0	11. 2	3. 6	100. 0
1938	9, 132	1, 171	7, 043	2, 565	866	20, 777	44. 0	5. 6	33. 9	12. 3	4. 2	100. 0
1939	10, 345	1, 308	7, 337	2, 763	838	22, 591	45. 8	5. 8	32. 5	12. 2	3. 7	100. 0
1940	12, 072	1, 308	7, 849	2, 979	880	25, 088	48. 1	5. 2	31. 3	11. 9	3. 5	100. 0
1941	13, 471	1, 432	8, 133	3, 162	934	27, 132	49. 6	5. 3	30. 0	11. 7	3. 4	100. 0
1942	15, 267	1, 532	8, 043	3, 436	1, 136	29, 414	51. 9	5. 2	27. 3	11. 7	3. 9	100. 0
1943	15, 463	1, 540	8, 733	3, 839	1, 304	30, 879	50. 1	5. 0	28. 3	12. 4	4. 2	100. 0
1944	16, 233	1, 618	9, 732	4, 176	1, 344	33, 103	49. 0	4. 9	29. 4	12. 6	4. 1	100. 0
1945	15, 134	1, 395	9, 939	4, 423	1, 442	32, 333	46. 8	4. 3	30. 7	13. 7	4. 5	100. 0
1946	13, 989	1, 537	10, 057	4, 550	1, 406	31, 539	44. 3	4. 9	31. 9	14. 4	4. 5	100. 0
1947	16, 522	1, 453	10, 771	5, 012	1, 426	35, 184	47. 0	4. 1	30. 6	14. 2	4. 1	100. 0
1948	15, 707	1, 451	11, 717	5, 615	1, 481	35, 971	43. 7	4. 0	32. 6	15. 6	4. 1	100. 0
1949	11, 472	1, 085	10, 683	5, 911	1, 539	30, 690	37. 4	3. 5	34. 8	19. 3	5. 0	100. 0

1950	13,527	1,120	11,449	6,841	1,573	34,510	39.2	3.2	33.2	19.8	4.6	100.0
1951	13,982	1,084	13,037	8,106	1,559	37,768	37.0	2.9	34.5	21.5	4.1	100.0
1952	12,231	1,031	13,282	8,705	1,581	36,830	33.2	2.8	36.1	23.6	4.3	100.0
1953	11,981	786	13,671	9,116	1,522	37,076	32.3	2.1	36.9	24.6	4.1	100.0
1954	10,262	739	13,427	9,488	1,449	35,365	29.0	2.1	38.0	26.8	4.1	100.0
1955	12,174	665	14,410	10,204	1,447	38,900	31.3	1.7	37.1	26.2	3.7	100.0
1956	13,123	734	15,181	10,930	1,542	41,510	31.6	1.8	36.6	26.3	3.7	100.0
1957	12,909	644	15,178	11,571	1,524	41,826	30.9	1.5	36.3	27.7	3.6	100.0
1958	10,754	538	14,204	11,943	1,693	39,132	27.5	1.4	36.3	30.5	4.3	100.0
1959	10,795	524	14,932	13,036	1,645	40,932	26.4	1.3	36.5	31.8	4.0	100.0
1960	10,886	478	14,935	13,822	1,723	41,844	26.0	1.2	35.7	33.0	4.1	100.0
1961	10,558	443	[3] 15,206	14,346	1,752	[3] 42,305	25.0	1.1	[3] 35.9	33.9	4.1	100.0

---

[1] The unit heat values employed are: Anthracite, 12,700 Btu per pound; bituminous coal and lignite, 13,100 Btu per pound; petroleum 5,800,000 Btu per barrel; natural gas, total production ×1,075 Btu minus repressuring vent and waste gas ×1,035. Waterpower includes installations owned by manufacturing plants and mines, as well as Government and privately owned public utilities. The fuel equivalent of waterpower is calculated from the kilowatt-hours of power produced wherever available, as it is true of all public-utility plants since 1919. Otherwise, the fuel equivalent is calculated from the reported horsepower of installed water wheels, assuming a capacity factor of 20 percent for factories and mines and 40 percent for public utilities.

[2] Alaska included for all years.

[3] Preliminary.

TABLE 2.—Value of mineral production in United States by mineral groups[1]

(Million dollars)

Mineral groups	1952-56 (average)	1957	1958	1959	1960[2]	1961	Change in 1961 from 1960 (percent)
Metals and nonmetals except fuels:							
Nonmetals	2,673	3,267	3,346	3,721	3,732	3,846	+3
Metals	1,872	2,137	1,593	1,570	2,022	1,927	−5
Total	4,545	5,404	4,939	5,291	5,754	5,773	(3)
Mineral fuels	10,463	12,709	11,589	11,950	12,142	12,358	+2
Grand total	15,008	18,113	16,528	17,241	17,896	18,131	+1

[1] Beginning with 1953, Alaska and Hawaii are included.
[2] Revised figure.
[3] Increase of less than 0.5 percent.

TABLE 3.—Mineral-fuel production in the United States

Mineral	1958		1959		1960		1961	
	Short tons (quantity)	Value (thousands)	Short tons (quantity)	Value (thousands)	Short tons (quantity)	Value (thousands)	Short tons (quantity)	Value (thousands)
Asphalt and related bitumens (native):								
Bituminous limestone and sandstone	1,326.493	$3,343	1,518.765	$3,868	1,242,874	$3,070	1,558,792	$12,818
Gilsonite	317,280	4,864	379,362	9,385	383,037	10,020		
Carbon dioxide, natural (estimated) thousand cubic feet	722,615	102	485,179	71	521,169	99	545,354	82
Coal:								
Bituminous and lignite[1] thousand short tons	410,446	1,996,281	412,028	1,965,607	415.512	1,950.425	402.977	1,844,563
Pennsylvania anthracite do	21.171	187,898	20,649	172,320	18.817	147.116	17.446	140.338
Helium thousand cubic feet	352,134	5,741	375,408	6,144	475,179	7,768	551,785	10,263
Natural gas million cubic feet	11,030,298	1,317,492	12,046,115	1,556,800	12,771,038	1,789,970	13,254,025	1,996,241
Natural gas liquids:								
Natural gasoline and cycle products thousand gallons	5,596,458	393,139	5,597,102	408,694	5,842.507	416.819	6.105,463	412.019
LP gases do	6,783,000	296,571	7,874,706	349,802	8,444.074	391,566	9,085.465	370.186
Peat	327,813	3,446	419,460	4,372	470,889	5,138	524,695	4.991
Petroleum (crude) thousand 42-gallon barrels	2,449,016	7,380,065	2,574,590	7,473,336	2,574.933	[2] 7,420,181	2,621.758	7,566,945
Total mineral fuels		11,589,000		11,950,000		[2] 12,142.000		12,378.000
Total all other minerals		4,939,000		5,291,000		5,751,000		5,620.000
Grand total, mineral production		16,528,000		17,241,000		[2] 17,893,000		17,998,000

[1] Includes small quantity of anthracite mined in States other than Pennsylvania.
[2] Revised figure.

Mines index of physical volume of mineral-fuel production increased 0.9, and the FRB index increased 1 percent.

Total Energy.—Total production of mineral-energy fuels and energy from waterpower in the United States in 1960 increased to 42,305 trillion Btu. As indicated in table 1 and figure 1, bituminous coal and anthracite output decreased, and all other components increased. Bituminous coal and lignite production decreased 3.0 percent, anthracite declined 7.0 percent, crude petroleum increased 1.8 percent, and natural gas increased 3.7 percent.

Value of Production.—Mineral-fuel production value increased by 0.5 percent in 1960, largely because of increases in physical quantity of production.

Domestic Production.—Production of both anthracite and bituminous coal were less than in 1960. Output of all other major fuels increased, paced by a 7.5-percent increase in LP gases, but the largest increases were in the nonfuel items, helium (16 percent increase) and peat (11 percent increase).

Indexes of Physical Production.—The Bureau of Mines index of the physical volume of mineral production in the United States is comprehensive and uses shifting weights to reflect the changing patterns of production and consumption as the economy grows and changes. The base period 1957–59 is used for the first time. Previously a 1947–49 base was employed. The fuels component of the index rose slightly less than 1 percent in 1961. The fuels component is made up of two parts: Coal, which decreased 4 percent, and crude oil-natural gas, which increased about 1.5 percent.

The FRB Index of Industrial Production, like the Bureau of Mines index, has a mineral fuels segment composed of two parts, coal and crude oil-natural gas. The movements of the Bureau and the FRB indexes show similar characteristics. In both, total fuels rose slightly; coal was down, and crude oil-natural gas was up. The mineral fuels segment moved from the February–March low in an uneven upward direction throughout the remainder of the year. The FRB index is available monthly on a seasonally adjusted basis.

TABLE 4.—Indexes of physical volume of mineral production in the United States, by group and subgroups [1]

(1957–59=100)

Year	All minerals	Fuels			Metals	Nonmetals
		Total	Coal	Crude oil and natural gas [2]		
1952	92.1	93.8	112.3	88.0	115.8	73.0
1953	93.5	94.6	107.0	90.7	122.4	74.7
1954	89.6	90.5	92.4	89.8	100.3	80.9
1955	98.9	99.0	106.8	96.4	118.2	89.0
1956	104.5	104.8	115.4	101.5	120.4	95.4
1957	104.8	104.6	112.5	102.1	122.1	97.1
1958	95.9	95.9	93.7	96.5	93.3	97.4
1959	99.4	99.6	93.9	101.4	84.5	105.4
1960	102.1	100.3	94.0	102.3	107.5	108.0
1961	102.9	101.2	90.8	104.5	103.3	110.6

[1] For description of index, see Review of the Mineral Industries. Minerals Yearbook 1956, v. 1, pp. 2–5. Indexes for components of the fuels index go back to 1880 (the initial year of the overall index) in Review of the Mineral-Fuel Industries. Minerals Yearbook 1958, v. 2, pp. 9–10.

[2] Does not cover isopentane, LP gases, and other natural gas liquids.

TABLE 5.—Indexes of industrial production, mineral fuels, seasonally adjusted

(1957=100)

Year and month	Total mineral fuels	Coal	Crude oil and natural gas	Total industrial production
1957	100	100	100	100
1958	92	83	94	93
1959	96	82	99	105
1960	[1] 96	[1] 83	98	108
1961 [2]	97	80	100	109
January	95	78	99	102
February	94	77	98	102
March	94	68	100	103
April	97	77	101	106
May	96	81	100	108
June	96	77	101	110
July	96	77	101	112
August	98	81	102	113
September	96	82	99	111
October	98	84	101	113
November	99	86	102	114
December	99	86	103	115

[1] Revised figure.
[2] Preliminary figure.

Source: Federal Reserve Bulletin.

CONSUMPTION

The first table in this section expresses consumption in the homogeneous unit, British thermal units. In this way it is possible to analyze the energy economy as an entity. The other tables in the section express consumption in the usual physical units.

Calculated Energy Consumption.—Total energy consumed increased 1.5 percent last year, but the increase was less than half as much as the 1960 increase. Consumption of coal decreased both in absolute terms and as a percentage of total energy, continuing a trend which started at the close of World War II. Petroleum and its products increased in absolute amount, and their market share remained steady at 41.5 percent. Natural gas and natural gas liquids continued their postwar trend of increasing faster than the energy economy as a whole. In 1961 one-third of the energy consumed was natural gas and natural gas liquids; this compares with 14 percent in 1945.

Consumption Patterns.—The two mineral fuels showing the most divergent movements were natural gas and anthracite. While both bituminous coal and coke showed year-to-year declines, the declines were not as great as the decline in anthracite. However, the decline in coke consumption was much closer to the 9.7-percent decline in anthracite than to the 1.6-percent decline in bituminous coal. The decline in coke consumption for the year was 8.6 percent, whereas the production of steel, coke's principal consumer, declined only 1 percent. These two results indicate substantial savings in the amount of coke needed to produce a given amount of steel. Except for coke plants and retail deliveries, all significant markets for bituminous coal increased during the year, paced by a 6-million-ton increase in consumption by steam electric-utility plants. Electric utilities now account for almost half the bituminous consumption in the country. Consumption by Class I railroads is no longer reported. In 1960, railroads consumed 2 million tons of coal, about two-thirds of 1 percent of total coal consumption. This figure contrasts with consumption of 132 million tons in 1944, which was 22 percent of total coal consumption.

Retail deliveries account for about one-third of the market for anthracite. Electric utilities and the steel industry are the other two important domestic consumers. Exports provide the other significant market, and it is the only one of the four showing an increase in 1961.

Sales of natural gas to each major consumer group increased. Total sales of distillate fuel oil increased, the dominant factor in the increase being space heating and cooking. In fact, consumption in this market increased 18 million barrels, while total sales increased only 7½ million barrels. Consumption by most of the consumer groups decreased. Sales of residual fuel oil declined 1.5 percent; all significant consuming groups except for the military and utilities registered declines.

Projections.—Projections of economic activity and demand for mineral fuels were published in the Bureau publication, Bulletin 585, Mineral Facts and Problems. Some of the projections were made by the Bureau and some, such as population and labor force, were made by other Government agencies and were merely reproduced in Bulletin 585. Estimates of future activity are both interesting and valuable. It is useful to have the estimates pertinent to the mineral fuels outlook published in a single table.

The estimates published here are the most recent ones available, and except for the GNP and industrial production index, they differ from the projections which appeared in Bulletin 585. The population and labor force estimates are based on the results of the 1960 population census. The revised estimate of coal consumption in 1975 leans heavily on the most recent Federal Power Commission (FPC) projections of electricity generation. The gas and petroleum projections are lower than those appearing in Bulletin 585, primarily because the growth of the industry since 1957 has been slower than it was in the previous decade. The projections show economic activity growing faster than energy consumption and energy consumption growing faster than population. This agrees with historical experience. But the projections of coal growth shows a sharp reversal of the postwar decline in coal production, resulting in a projected rate of growth for coal that is faster than those for the total economy, energy economy, or any of the components of the energy economy.

TABLE 6.—Calculated consumption of energy fuels and energy from waterpower in trillion British thermal units and percentage contributed by each in the United States [1]

Year	Bituminous coal and lignite [2]	Anthracite	Crude oil	Petroleum products net: E, exported; I, imported	Natural gas, dry	Natural gas liquids	Waterpower	Grand total	Percentage: Bituminous coal and lignite	Percentage: Anthracite	Percentage: Crude oil	Percentage: Petroleum products net: E, exported; I, imported	Percentage: Natural gas, dry	Percentage: Natural gas liquids	Percentage: Waterpower	Percentage: Grand total
1920	13,325	2,179	3,027	E 393	827	42	775	19.782	67.4	11.0	15.3	E 2.0	4.2	0.2	3.9	100.0
1921	10,266	2,082	3,016	E 342	682	50	656	16.410	62.6	12.7	18.4	E 2.1	4.1	.3	4.0	100.0
1922	11,185	1,443	3,390	E 319	785	56	675	17,215	65.0	8.4	19.7	E 1.9	4.6	.3	3.9	100.0
1923	13,598	2,208	4.419	E 389	1,032	90	727	21,685	62.7	10.2	20.4	E 1.8	4.8	.4	3.3	100.0
1924	12,681	2,050	4,228	E 464	1,170	103	685	20,453	62.0	10.0	20.7	E 2.3	5.7	.5	3.4	100.0
1925	13,079	1,627	4,641	E 485	1,212	124	701	20,899	62.6	7.8	22.2	E 2.3	5.8	.6	3.3	100.0
1926	13.954	1,961	4,876	E 545	1,335	149	765	22.495	62.0	8.7	21.7	E 2.4	5.9	.7	3.4	100.0
1927	13,095	1,897	5,027	E 650	1,465	179	815	21,828	60.0	8.7	23.0	E 3.0	6.7	.8	3.8	100.0
1928	13,069	1,871	5,474	E 711	1,588	200	890	22,381	58.4	8.4	24.4	E 3.2	7.1	.9	4.0	100.0
1929	13,612	1,815	5,894	E 600	1,942	246	847	23,756	57.3	7.6	24.8	E 2.5	8.2	1.0	3.6	100.0
1930	11,921	1,718	6,148	E 496	1,969	243	785	22,288	53.5	7.7	27.6	E 2.2	8.8	1.1	3.5	100.0
1931	9,743	1,484	5.304	E 339	1,715	200	692	18,799	51.8	7.9	28.2	E 1.8	9.1	1.1	3.7	100.0
1932	8,041	1,283	4,830	E 240	1,594	158	726	16,392	49.1	7.8	29.5	E 1.5	9.7	1.0	4.4	100.0
1933	8,323	1,260	5,143	E 299	1,600	144	729	16,900	49.2	7.5	30.4	E 1.8	9.5	.9	4.3	100.0
1934	9,008	1,410	5,136	E 318	1,819	161	721	17,937	50.2	7.9	28.6	E 1.8	10.2	.9	4.0	100.0
1935	9,336	1,298	5,799	E 300	1,974	169	831	19,107	48.9	6.8	30.4	E 1.6	10.3	.9	4.3	100.0
1936	10,697	1,351	6,426	E 302	2,221	184	841	21.418	49.9	6.3	30.0	E 1.4	10.4	.9	3.9	100.0
1937	11,286	1,280	7,004	E 400	2,468	208	905	22,751	49.6	5.6	30.8	E 1.7	10.8	.9	4.0	100.0
1938	8,811	1.148	6,921	E 456	2,348	209	899	19,880	44.3	5.8	34.8	E 2.3	11.8	1.1	4.5	100.0
1939	9,854	1,262	7,327	E 486	2,539	221	872	21,589	45.6	5.9	33.9	E 2.2	11.8	1.0	4.0	100.0
1940	11,290	1,245	7,662	E 175	2,726	243	917	23,908	47.2	5.2	32.1	E .7	11.4	1.0	3.8	100.0
1941	12,893	1,338	8,343	E 139	2,851	364	975	26,625	48.4	5.0	31.3	E .5	10.7	1.4	3.7	100.0
1942	14,149	1,435	7,987	E 320	3,102	367	1,177	27.897	50.7	5.2	28.6	E 1.1	11.1	1.3	4.2	100.0
1943	15,557	1,450	8,538	E 310	3,481	379	1,347	30,442	51.1	4.8	28.1	E 1.0	11.4	1.2	4.4	100.0
1944	15,447	1,509	9,923	E 662	3,775	442	1,387	31,821	48.5	4.7	31.2	E 2.1	11.9	1.4	4.4	100.0
1945	14,661	1,311	10,199	E 580	3,973	491	1,486	31,541	46.5	4.2	32.3	E 1.8	12.6	1.5	4.7	100.0
1946	13,110	1,369	10,270	E 283	4.089	493	1,446	30,494	43.0	4.5	33.7	E .9	13.4	1.6	4.7	100.0
1947	14,302	1,224	11,065	E 262	4,518	564	1,459	32,870	43.5	3.7	33.7	E .8	13.8	1.7	4.4	100.0
1948	13,622	1,275	12,085	E 147	5,033	619	1,507	33,994	40.1	3.8	35.5	E .4	14.8	1.8	4.4	100.0
1949	11,673	958	11,402	I 57	5,289	660	1,565	31,604	36.9	3.0	36.1	I .2	16.7	2.1	5.0	100.0

1950	11, 900	1, 013	12, 304	I 402	6, 150	783	1, 601	34, 153	34. 8	3. 0	36. 0	I 1. 2	18. 0	2. 3	4. 7	100. 0
1951	12. 285	940	13, 867	I 107	7, 248	874	1, 592	36, 913	33. 3	2. 5	37. 6	I . 3	19. 6	2. 4	4. 3	100. 0
1952	10, 971	897	14, 248	I 132	7, 760	954	1, 614	36, 576	30. 0	2. 4	39. 0	I . 4	21. 2	2. 6	4. 4	100. 0
1953	11. 182	711	14. 912	I 180	8, 156	1, 006	1, 550	37, 697	29. 7	1. 9	39. 5	I . 5	21. 6	2. 7	4. 1	100. 0
1954	9, 512	683	14, 830	I 260	8, 554	1, 042	1, 479	36, 360	26. 2	1. 9	40. 8	I . 7	23. 5	2. 8	4. 1	100. 0
1955	11, 101	599	15, 956	I 372	9, 232	1, 196	1, 497	39. 956	27. 8	1. 5	39. 9	I . 9	23. 1	3. 0	3. 8	100. 0
1956	11, 338	610	16, 994	I 424	9, 834	1, 209	1, 598	42, 007	27. 0	1. 4	40. 5	I 1. 0	23. 4	2. 9	3. 8	100. 0
1957	10. 838	528	16. 960	I 368	10, 416	1, 242	1, 568	41. 920	25. 8	1. 3	40. 5	I . 9	24. 8	3. 0	3. 7	100. 0
1958	9, 607	483	16, 308	I 1, 120	10, 995	1. 240	1, 740	41 493	23. 1	1. 2	39. 3	I 2. 7	26. 5	3. 0	4. 2	100. 0
1959	9, 596	478	16, 994	I 1, 313	11, 991	1, 348	1, 691	43, 411	22. 1	1. 1	39. 2	I 3. 0	27. 6	3. 1	3. 9	100. 0
1960	9. 967	447	17, 172	I 1, 436	12, 736	1, 427	1, 775	44. 960	22. 2	1. 0	38. 2	I 3. 2	28. 3	3. 2	3. 9	100. 0
1961	9, 809	404	[3]17, 372	[2] I 1, 554	13, 239	1, 498	1, 777	[3]45, 653	21. 5	. 9	[2] 38. 0	[2] I 3. 4	29. 0	3. 3	3. 9	100. 0

---

[1] The heat values employed are: Anthracite, 12,700 Btu per pound; bituminous coal and lignite, 13,100 Btu per pound; crude oil, 5,800,000 Btu per barrel; weighted average Btu on petroleum products by using 5,248,000 gasoline, 5,670,000 kerosine, 5,825,000 distillate, 6,287,000 residual, 6,064,800 lubricants, 5,537,280 wax, 6,636,000 asphalt, and 5,796,000 miscellaneous; natural gas dry, 1,035 Btu per cubic foot; natural gas liquids weighted average Btu's based on production; natural gasoline 110,000 Btu per gallon, and LP gas 95,500 Btu per gallon. Waterpower converted to coal equivalent at the prevailing rate of pounds of coal per kilowatt-hour each year at central electric stations.

[2] Alaska included for all years.

[3] Preliminary, 50-State basis.

TABLE 7.—Apparent consumption of mineral fuels and related products

Commodity	1960	1961	Percent change from 1960
Fuels:			
Bituminous coal ... million net tons	380.4	374.4	−1.6
Crude petroleum, runs to stills ... million barrels	2,952.5	2,987.2	+1.2
Natural gas ... billion cubic feet	12,509.4	13,081.7	+4.5
Anthracite ... million net tons	17.6	15.9	−9.7
Products:			
All oils, domestic demand ... million barrels	[1] 3,566.5	3,535.8	−.9
Coke ... million net tons	56.9	52.0	−8.6
Petroleum asphalt ... do	19.0	19.6	+3.1

[1] Revised figure.

TABLE 8.—Sales of fuel oil and natural gas in the United States, by major consumer groups

(Fuel oil—thousand barrels; natural gas—billion cubic feet)

Product and year	Railroads	Vessels	Gas and electric power-plants	Smelters, mines, and manufactures	Space heating and cooking	Military	Oil-company fuel	Miscellaneous	Total
Distillate fuel oil:									
1960	86,490	18,730	4,742	34,271	438,010	10,793	8,347	81,942	683,325
1961	85,180	14,566	4,151	31,026	456,062	11,484	8,743	79,626	690,874
Residual fuel oil:									
1960	5,610	94,084	85,408	157,270	125,088	31,724	45,061	6,291	550,536
1961	5,347	87,308	87,881	153,766	121,097	36,762	44,399	6,426	542,986
Natural gas:									
1960			[1] 1,724	5,484	4,123		2,902		12,509
1961 [2]			[1] 1,825		4,372				12,959

[1] Memorandum entry, not additive; includes gas other than natural. Natural gas component included under smelters, mines, and manufactures.

[2] Preliminary figure.

TABLE 9.—Consumption of bituminous coal and lignite in the United States, by major consumer groups

(Thousand net tons)

Year	Electric power utilities [1]	Class I railroads [2]	Coke plants	Steel and rolling mills	Cement mills	Other mining and manufacturing industries	Retail deliveries to other consumers	Bunker, foreign and lake vessel [3]	Total
1959	165,788	2,600	79,181	6,674	8,510	73,396	29,138	969	366,256
1960	173,882	2,101	81,015	7,378	8,216	76,487	30,405	945	380,429
1961	179,629	(4)	73,881	7,495	7,615	77,280	27,735	770	374,405

[1] Federal Power Commission.

[2] Association of American Railroads.

[3] Bureau of the Census.

[4] Canvass discontinued.

TABLE 10.—Projections: Mineral fuels and economic trends

	1960 actual	1975 projection	Projected growth rate (percent per year)
Population thousands	180,677	[1] 235,275	1.78
Labor force do	69,877	[2] 93,031	1.92
Gross national product billions of 1954 dollars	441	[3] 728	3.40
Index of industrial production (1957=100)	108	[3] 178	3.38
Energy consumption—United States trillion Btu	44,960	[4] 70,404	3.04
Petroleum consumption (including natural gas liquids) million barrels	3,566	[4] 4,896	2.13
Natural gas consumption billion cubic feet	12,509	[4] 19,985	3.17
Coal consumption million tons	398	[4] 725	4.08

[1] Bureau of the Census, Current Population Reports, p-25, No. 215.
[2] Bureau of Labor Statistics.
[3] Staff, Bureau of Mines, Mineral Facts and Problems. Bulletin 585, 1960, 1,016 pp.
[4] T. Reed Scollon. Trends in Utilization of Energy Resources in the United States. Presented at World Power Conf., Melbourne, Australia, October 1962, 25 pages.

STOCKS

Physical Stocks.—The changes during the year in the stock levels of the various mineral fuels and products show a mixed picture. Inventories of crude petroleum and products as a group increased 5 percent. Residual fuel oil and petroleum asphalt showed no change, but at the other extreme, stocks of natural gas liquids increased 28 percent to an alltime high of 37,067,000 barrels. These increases were considered unfortunate by the industry, as heavy inventories tend to put a downward pressure on prices. Underground storage of natural gas continued its upward trend. Bituminous stocks reached their lowest yearend level since 1955. Anthracite producers' stocks in ground storage rose during the year but were still considerably lower than any recent yearend level, except that of 1960.

TABLE 11.—Physical stocks of crude mineral fuels at yearend

(Producers' stocks, unless otherwise indicated)

Fuel	1957	1958	1959	1960	1961
Coal and related products:					
Bituminous and lignite [1] net tons	85,503,119	80,263,680	79,654,678	76,898,317	74,449,230
Pennsylvania anthracite [2] do	499,620	406,375	429,020	199,356	232,520
Coke do	3,148,776	3,823,364	4,682,436	4,738,088	4,038,717
Petroleum and related products:					
Carbon black thousand pounds	349,399	300,923	218,893	[3] 292,982	287,899
Crude petroleum and petroleum products thousand barrels	839,906	789,538	808,970	[3] 784.558	825,074
Crude petroleum do	281,813	262,742	257,129	239,800	244,664
Natural gas liquids do	20,756	22,752	24,887	28,931	37,067
Gasoline do	196,776	187,004	187,613	194,774	195,830
Distillate fuel oil do	149,449	125,508	151,164	138,455	152,018
Residual fuel oil do	59,959	59,560	53,501	44,870	44,869
Petroleum asphalt do	10,463	9,757	10,948	[3] 12,991	12,999
Other refined products do	121,290	122,215	123,728	[3] 124,737	137,627
Natural gas [4] billion cubic feet	1,674	1,764	1,901	2,184	2,344

[1] Stocks at industrial, consumer, and retail yards and on upper Lake docks.
[2] Producers' stocks in ground storage.
[3] Revised figure.
[4] American Gas Association.

LABOR AND PRODUCTIVITY

Employment.—The Bureau of Mines publishes two sets of employment figures for bituminous coal mines. One set (presented in the next chapter of this volume) is unadjusted for lack of coverage, but it is directly comparable to the reported injuries and is used for calculating injury rates. These data are adjusted for coverage, and the resulting adjusted figures are published in the chapter on bituminous coal and used for the productivity analyses. Employment figures for the anthracite industry represent full coverage for both productivity and injury analyses and are virtually identical. The Bureau of Labor Statistics, U.S. Department of Labor, publishes a third set of employment data, based upon payroll information. The Bureau of Employment Security (BES), U.S. Department of Labor, publishes still another series based on reports to state agencies under unemployment security laws. Table 12 indicates the order of difference between the BLS information on total employment, the Bureau of Mines fully adjusted data, and the BES figures. Generally the series move in the same direction, but they have differed markedly on several occasions. BLS data are presented in table 13 to facilitate comparison with Bureau of Mines figures.

The BLS statistics of employment, hours, earnings, and labor turnover have been revised, and the new series are not comparable with the previously published information. The revisions involved reclassification on the basis of the 1957 Standard Industrial Classification, improved sampling of small firms, and a benchmark adjustment to incorporate new unemployment-insurance data. A detailed discussion of the revisions may be found in BLS Bulletin 1312, Employment and Earnings Statistics.

The information presented in table 13 permits comparison between the various segments of the fuel mining and manufacturing industries. Employment in bituminous coal mines declined throughout the year, and the average for the year was about 15 percent less than the average employment in 1960. The only segment of the mineral fuels and related manufacturing industries showing an increase in 1961 was the "other petroleum and coal products." Crude petroleum and gas

TABLE 12.—Comparison of data on total employment in the mineral-fuel industries

(In thousands)

Year	Petroleum		Bituminous coal			Anthracite		
	BLS data [1]	BES data [2]	BLS data [1]	BES data [2]	Mines data [3]	BLS data [1]	BES data [2]	Mines data [3]
1956	340.1	314.0	228.6	229.0	228.2	(4)	29.7	31.5
1957	344.0	315.7	229.8	227.2	228.6	(4)	28.9	30.8
1958	327.5	313.2	193.0	192.7	197.4	22.1	23.3	26.5
1959	330.9	313.6	178.3	171.6	179.6	18.5	18.8	23.3
1960	313.9	299.6	168.2	163.2	169.4	14.0	14.9	19.1
1961	308.9	294.1	145.1	145.6	150.5	10.4	12.8	15.8

[1] Bureau of Labor Statistics. Employment and Earnings Statistics. Bull. 1312. Revised. Prior employment statistics are not comparable to the revised statistics.

[2] Bureau of Employment Security, Employment and Wages.

[3] Minerals Yearbook, average, men working daily.

[4] Data not available.

TABLE 13.—Total employment in the mineral-fuel industries

(Thousands)

Year and month	Mining					Manufacturing		
	Total	Anthracite	Bituminous coal	Crude petroleum and natural gas products	Crude petroleum and natural gas (except contract services)[1]	Petroleum refining and related industries[3]	Petroleum refining	Other petroleum and coal products
1952–56 (average)	(2)	(2)	243.3	321.0	(2)	237.3	202.7	(2)
1957	(2)	(2)	229.8	344.0	(2)	232.2	198.9	(2)
1958	542.6	22.1	193.0	327.5	192.5	223.8	190.4	23.8
1959	527.7	18.5	178.3	330.9	186.4	215.3	181.4	24.6
1960	496.1	14.0	168.2	313.9	181.7	211.7	177.6	24.6
1961:								
January	470.2	11.9	152.0	306.3	177.6	203.0	172.0	21.7
February	467.6	11.6	151.6	304.4	176.9	201.5	171.7	20.5
March	462.0	10.1	147.4	304.5	175.4	202.4	171.8	21.3
April	459.4	10.9	142.4	306.1	175.3	204.0	172.1	22.6
May	463.1	10.2	143.0	309.9	175.4	205.3	171.6	24.1
June	467.9	10.3	143.2	314.4	178.2	207.9	172.9	25.5
July	460.9	10.1	132.8	318.0	180.2	204.5	169.6	31.9
August	468.8	10.2	143.7	314.9	180.6	207.4	171.8	32.9
September	466.2	10.2	145.4	310.6	177.8	204.9	170.4	34.5
October	461.7	9.7	146.5	305.5	175.1	203.5	169.0	34.5
November	463.3	9.7	147.2	306.4	174.8	197.1	164.2	35.6
December	462.2	9.5	146.4	306.3	174.1	195.0	163.1	34.9
Average, 1961	464.4	10.4	145.1	308.9	176.7	203.0	170.0	33.0

[1] Not included in total because data are also included with crude petroleum and natural gas production.
[2] Data not available.
[3] Standard Industrial Classification industry 295, paving and roofing materials included in total.

Source: Bureau of Labor Statistics. Employment and Earnings Statistics, Bull. 1312. Revised. Prior employment statistics are not comparable to the revised statistics.

employment declined again, continuing a movement which commenced in 1958.

The decrease in employment in bituminous coal mines (average number of men working daily) occurred in spite of the increase in the number of days worked to 193, compared with 191 in 1960. The anthracite industry showed an increase to 196 in days worked, compared with 176 in 1960.

Productivity.—The productivity of labor continued to increase in bituminous coal mining and also rose in anthracite mining. The net tons per man per day reached 13.87 in bituminous coal mining (an alltime high) and was 5.63 in anthracite mining (also an alltime record), compared with 12.83 and 5.60, respectively, in 1960 and 6.77 and 2.83, respectively, in 1950.

The BLS calculates labor productivity for several manufacturing and mining industries. The data of interest to the fuel industry are presented in table 16. The productivity is expressed in three ways—production per employee, per production worker, and per production worker man-hour. All are expressed in terms of indexes. The common experience in the three industries shown is for the ratio of production workers to total employees to drop and hours worked per man to decrease. This means that the index per production-worker man-hour increases the fastest and productivity per employee rises the slowest. The BLS does not publish a productivity series on the crude oil and natural gas industry because thay have been unable to define

TABLE 14.—Average hours and gross earnings of production workers in the mineral fuels and related industries

Year and month	Mining											
	Total fuels [1]			Total coal mining			Bituminous coal			Crude petroleum and natural gas		
	Weekly earnings	Weekly hours	Hourly earnings	Weekly earnings	Weekly hours	Hourly earnings	Weekly earnings	Weekly hours	Hourly earnings	Weekly earnings	Weekly hours	Hourly earnings
1952-56 (average)	(2)	(2)	(2)	(2)	(2)	(2)	$85.71	35.0	$2.44	(2)	(2)	(2)
1957	(2)	(2)	(2)	(2)	(2)	(2)	106.00	36.3	2.92	(2)	(2)	(2)
1958	$99.72	38.5	$2.59	$95.70	33.0	$2.90	97.57	33.3	2.93	$100.62	42.1	$2.39
1959	106.53	39.9	2.67	109.03	35.4	3.08	111.70	35.8	3.12	103.52	42.6	2.43
1960	106.92	39.6	2.70	110.76	35.5	3.12	112.77	35.8	3.15	103.32	42.0	2.46
1961:												
January	108.78	39.7	2.74	110.09	35.4	3.11	110.84	35.3	3.14	106.68	42.0	2.54
February	106.23	39.2	2.71	107.22	34.7	3.09	108.26	34.7	3.12	104.42	41.6	2.51
March	103.68	38.4	2.70	96.71	31.5	3.07	97.34	31.4	3.10	104.75	41.9	2.50
April	105.54	38.8	2.72	101.35	32.8	3.09	102.65	32.9	3.12	105.75	41.8	2.53
May	106.10	39.3	2.70	106.91	34.6	3.09	108.26	34.7	3.12	104.00	41.6	2.50
June	108.40	40.0	2.71	115.18	36.8	3.13	117.29	37.0	3.17	103.75	41.5	2.50
July	111.38	40.8	2.73	119.32	38.0	3.14	120.46	38.0	3.17	106.93	42.1	2.54
August	108.40	40.0	2.71	113.83	36.6	3.11	115.55	36.8	3.14	104.67	41.7	2.51
September	109.33	39.9	2.74	114.19	36.6	3.12	115.92	36.8	3.15	106.08	41.6	2.55
October	111.66	40.9	2.73	117.18	37.8	3.10	118.63	37.9	3.13	107.95	42.5	2.54
November	110.83	40.3	2.75	116.94	37.6	3.11	118.38	37.7	3.14	106.75	41.7	2.56
December	111.50	40.4	2.76	117.62	37.7	3.12	118.69	37.8	3.14	107.17	41.7	2.57
Average, 1961	108.26	39.8	2.72	111.34	35.8	3.11	112.73	35.9	3.14	105.75	41.8	2.53

Year and month	Manufacturing								
	Petroleum refining and related industries			Petroleum refining			Other petroleum and coal products		
	Weekly earnings	Weekly hours	Hourly earnings	Weekly earnings	Weekly hours	Hourly earnings	Weekly earnings	Weekly hours	Hourly earnings
1952-56 (average) [1]	$93.93	40.8	$2.30	$96.64	40.1	$2.41	(2)	(2)	(2)
1957	108.53	40.8	2.66	111.91	40.4	2.77	(2)	(2)	(2)
1958	111.66	40.9	2.73	115.02	40.5	2.84	$94.60	43.0	$2.20
1959	117.42	41.2	2.85	121.99	40.8	2.99	97.61	43.0	2.27
1960	118.78	41.1	2.89	123.22	40.8	3.02	99.26	42.6	2.33
1961:									
January	123.90	41.3	3.00	129.58	41.4	3.13	96.12	40.9	2.35
February	121.00	40.2	3.01	126.45	40.4	3.13	91.80	39.4	2.33
March	121.80	40.6	3.00	127.17	40.5	3.14	95.17	41.2	2.31
April	124.42	41.2	3.02	129.56	41.0	3.16	99.41	42.3	2.35
May	123.30	41.1	3.00	128.21	40.7	3.15	101.24	42.9	2.36
June	126.24	41.8	3.02	130.38	41.0	3.18	109.66	45.5	2.41
July	126.42	42.0	3.01	131.24	41.4	3.17	105.70	44.6	2.37
August	122.59	41.0	2.99	126.95	40.3	3.15	103.81	43.8	2.37
September	126.88	41.6	3.05	131.29	40.9	3.21	107.93	44.6	2.42
October	125.93	41.7	3.02	129.65	40.9	3.17	110.74	45.2	2.45
November	126.46	41.6	3.04	132.07	41.4	3.19	101.28	42.2	2.40
December	123.62	40.8	3.03	129.34	40.8	3.17	97.44	40.6	2.40
Average, 1961	124.42	41.2	3.02	129.24	40.9	3.16	102.10	42.9	2.38

[1] Weighted average using employment as weights computed by author.

[2] Data not available.

Source: Bureau of Labor Statistics. Employment and Earnings Statistics, Bull. 1312; Employment and Earnings, June 1962.

accurately the labor force involved in crude oil and natural gas production.

Hours and Earnings.—With the exception of petroleum refining, there was no significant change in the hours and earnings of the mineral-fuel and related manufacturing industries during the year. Hours remained constant in petroleum refining, but wages increased an average of 14 cents an hour, with weekly earnings increasing about 5 percent

Labor-Turnover Rates.—The data presented in table 15 are sensitive indicators of the state of business. The recovery during 1961 is reflected in both the accession and separation rates.

TABLE 15.—Labor turnover rates, mineral fuels and related industries

(Per thousand employees)

Rates, year, and month	All manufacturing	Petroleum refining and related industries[1]	Petroleum refining	Coal mining
Total accession rate:				
1960 average	38	12	8	16
1961:				
January	37	11	8	16
February	32	8	6	15
March	40	10	6	16
April	40	13	7	8
May	42	18	8	19
June	50	26	20	13
July	44	14	10	36
August	53	12	9	34
September	47	13	9	30
October	43	12	10	23
November	33	9	7	19
December	26	7	5	10
Average, 1961	41	13	9	21
Total separation rate:				
1960 average	43	16	12	36
1961:				
January	47	16	13	17
February	39	11	8	35
March	39	11	9	34
April	34	10	9	26
May	35	10	7	23
June	36	14	11	14
July	41	17	11	58
August	41	22	20	17
September	51	28	22	18
October	41	19	14	24
November	40	22	12	16
December	40	16	10	23
Average, 1961	40	16	11	25
Layoff rate:				
1960 average	24	6	3	29
1961:				
January	32	6	2	11
February	26	4	1	28
March	23	4	2	27
April	19	3	2	19
May	18	2	1	17
June	17	4	2	9
July	23	6	2	48
August	17	6	4	9
September	20	10	6	7
October	20	7	3	14
November	22	13	4	8
December	26	8	3	17
Average, 1961	22	6	3	17

[1] Standard Industrial Classification industry 295, paving and roofing materials included in total.

Source: Bureau of Labor Statistics. Employment and Earnings Statistics. Bull. 1312. Revised figures. Prior employment statistics are not comparable to the revised statistics.

TABLE 16.—Index of labor output

(1947=100)

Year	Petroleum refining			Bituminous coal and lignite mining			Anthracite mining		
	Employee	Production worker	Production worker man-hour	Employee	Production worker	Production worker man-hour	Employee	Production worker	Production worker man-hour
1951–55 (average)	133.1	139.1	146.2	111.6	114.3	134.4	91.8	93.9	114.4
1956	154.4	162.4	171.5	147.7	152.5	164.3	133.6	137.3	157.5
1957	154.5	165.0	174.4	144.2	150.3	166.9	120.7	122.0	148.0
1958	160.0	170.7	183.4	141.4	150.2	179.2	141.6	145.6	190.1
1959	179.6	192.3	204.8	165.1	175.7	193.3	170.9	180.5	219.8
1960 [1]	(2)	(2)	(2)	175.9	190.2	214.0	204.5	218.4	255.1

[1] Preliminary figure.
[2] Not available.

Source: Bureau of Labor Statistics.

PRICES AND COSTS

Index of Implicit Unit Value.—This index appears in the fuels review chapter for the first time and was developed by the Chief Economist, Bureau of Mines. A detailed description of the index will appear in the forthcoming Bureau publication, Indexes of the Mineral Industries. This index was derived by dividing an index of value of production by the index of physical volume (table 4). An index of value was computed specifically for the purpose of deriving the index of implicit value. In order to insure a meaningful implicit value, it was necessary to insure that the index of value had the same coverage as the index of physical volume.

The fuels index increased slightly during the year as the two components moved in opposite directions; coal was down, and crude oil and natural gas increased.

Mine Value.—This is the second year this index has appeared in the fuels volume. The index appeared a year earlier in the nonfuels volume, but it is only in the fuels review that detail of the fuels component is shown. The purpose of this index is to indicate the return to the producer before there has been any value added in later stages of fabrication. The index has been rebased. It was formerly on a 1947–49 base and is now on a 1957–59 base.

The total fuels index rose 1 point during the year. The coal component decreased 2 points, while the crude and gas index increased 1. The average unit mine value and implicit unit value show similar movements, although the mine value is somewhat lower. The differences are due to differences in coverage and stage of fabrication.

Prices.—The overall wholesale price index was virtually unchanged at 100.3, compared with the 1960 average of 100.7. Fuel prices showed little change last year. This is the first time in several years that the gas price index has not shown a substantial increase. In fact, this year the largest increase was in the price index of refined petroleum products. Of the individual product items, the prices of distillate rose about 6 percent, and residual prices rose about 4.5 percent. All other items with the exception of gas at the wellhead were steady. Value of gas at the wellhead was up almost 8 percent, somewhat less than the 8.5-percent increase in 1960.

Costs.—An index of major input expenses in anthracite, bituminous coal, and crude petroleum production has been constructed by the Office of Chief Economist, Bureau of Mines. This index does not compare the actual costs of producing these fuels but only indicates the changes in operating costs for each since 1952. The categories of expense considered are labor, supplies, fuels, and purchased electricity. The weights are based on the 1958 Census of Mineral Industries. The labor input has been adjusted for productivity changes, using the data in table 22. The index has also been rebased. The new base is 1957–59; the previous base was 1950. These indexes do not include capital costs. A comparable index for metal mining is presented in the Review of the Mineral Industries, in the first volume of this publication.

Labor costs are the largest factor in the determination of the index of major input expenses, ranging from 50 percent in petroleum to 72 percent in anthracite. The decreasing costs in anthracite and bituminous coal have occurred in a period of increasing wage rates; wages in bituminous coal have risen two-thirds since 1950. However, the increased wages have been more than offset by productivity advances, thus reducing unit labor costs. This has not been the case in petroleum and natural gas. Although wage rates have risen less than the rates in bituminous coal, unit labor costs have increased as productivity advances have not kept pace with wage increases.

Relative Labor Cost.—The most important element in operating costs is wages and salaries. The index of relative labor costs adjusts average earnings by changes in productivity to indicate the direction of movement in real labor costs per ton of coal and barrel of oil. When the changes in value of a ton of coal or barrel of oil are considered, an index of labor costs per dollar of product is obtained. The changes in labor costs per ton and per dollar have been irregular but down in the coal industries since 1952 and reached a low point in 1961. In this same period the trend in real labor costs in the petroleum industry can be divided into two parts. Real labor costs were rising through 1958, but they have shown a tendency to decrease since.

Machinery Prices.—Detailed wholesale indexes of machinery and equipment prices were published by the BLS in March 1962. The items of importance to the mineral-fuel industry are presented in table 23. All prices increased in 1961 except those for scrapers and graders, which showed a slight decline. The largest increase was recorded by contractors' air tools. The price of oilfield equipment advanced about 1.5 percent, after having remained virtually steady for the 4 previous years.

Fuel Costs, Electricity Generation.—Table 24 shows the fuel cost in cents per million Btu of electric power generated for the major mineral fuels by regions of the United States. This table serves as an index of the price of the various fuels to a major consuming industry.

Fringe Benefits for Mineworkers.—The June 1962 Monthly Labor Review contained a review of supplementary benefits to labor paid by the mining industry. In recent years nonwage benefits have assumed importance in the total labor bill. The BLS uses a four-category classification system in their analysis. The four categories are private welfare plans, legally required payments, premium pay, and paid leave. The private welfare plans are the most expensive to the industry, accounting for 8.8 percent of the gross payroll. The least expensive item is paid leave, accounting for 4.7 percent of gross payrolls. But for all mining, the total of all supplementary benefits enumerated by the BLS amounts to 25 percent of the straight-time payroll.

Variations of payments in the various mining industries are great. Payments to private welfare plans by the bituminous coal industry accounted for more than 18 percent of the gross payroll. This contrasts with 2 percent for oilfield and gasfield services.

The largest payments by the bituminous coal industry are paid to private welfare plans (18.1 percent of gross payroll); whereas the largest payments made by the crude petroleum and natural gas industry are legally required payments (7.2 percent of gross payroll).

Total supplementary payments by the crude oil and natural gas industry amount to 25 percent of gross payroll, the same percentage as paid by all industries. On the other hand, supplementary payments in bituminous coal amounted to one-third of gross payroll. More than half these payments were to the private welfare plans.

TABLE 17.—Index of implicit unit value of minerals produced in the United States, by group and subgroup

(1957-59=100)

Year	All minerals	Fuels			Metals, total	Nonmetals, total
		Total	Coal	Crude oil and natural gas		
1952	84.2	84.9	100.9	81.6	79.0	86.0
1953	89.2	89.8	100.9	87.7	83.7	91.3
1954	90.7	90.7	92.9	91.1	85.6	94.3
1955	92.3	90.1	99.7	91.1	96.0	96.4
1956	96.1	92.8	97.7	92.2	110.8	99.4
1957	99.9	100.6	103.3	101.1	99.0	97.6
1958	99.7	100.0	99.2	100.1	96.7	99.7
1959	100.3	99.3	96.9	98.7	105.2	102.5
1960	101.4	100.2	95.0	99.9	106.4	100.3
1961	101.1	101.8	93.6	101.2	105.6	100.9

TABLE 18.—Index of average unit mine value of minerals produced in the United States, by group and subgroup [1]

(1957-59=100)

Year	All minerals	Metals total	Nonmetals total	Fuels		
				Total	Coal	Crude oil and natural gas
1952	89	85	89	89	102	84
1953	93	88	93	93	103	89
1954	93	90	94	92	93	92
1955	94	101	95	92	92	92
1956	97	110	98	95	98	93
1957	102	101	99	102	103	102
1958	99	97	99	100	100	100
1959	98	102	101	98	97	98
1960	98	105	102	96	95	98
1961	98	103	102	97	93	99

[1] For description of index, see Review of Mineral Industries. Minerals Yearbook, 1959, V. 1, 1960, pp. 22–24.

TABLE 19.—Average monthly wholesale price indexes for selected fuels

(1957-59=100 unless otherwise specified)

Year and month	Wholesale price index, all commodities	Fuels and related products, and power [1]	Coal	Coke	Gas [2]	Electricity [2]	Crude petroleum and natural gasoline	Petroleum products refined
1952-56 (average)	93.8	95.1	88.7	81.9	109.4	98.3	89.7	94.5
1957	99.0	102.7	100.8	98.3	116.1	95.5	100.8	106.4
1958	100.4	98.7	99.7	98.4	101.7	100.4	101.1	97.0
1959	100.6	98.7	99.4	103.2	110.9	100.8	98.2	96.5
1960	100.7	99.6	98.9	103.6	116.6	101.9	97.7	97.6
1961:								
January	101.0	102.6	100.1	103.6	121.1	102.3	97.7	102.4
February	101.0	103.1	100.1	103.6	122.3	102.2	97.7	103.1
March	101.0	102.9	99.6	103.6	121.8	102.4	97.7	102.7
April	100.5	100.9	97.0	103.6	118.3	102.5	98.0	99.7
May	100.0	99.5	95.2	103.6	118.7	102.4	98.0	97.2
June	99.5	100.1	95.4	103.6	115.4	102.3	98.0	98.9
July	99.9	100.4	96.3	103.6	115.6	102.5	98.0	99.3
August	100.1	100.2	96.7	103.6	116.6	102.4	98.0	98.8
September	100.0	99.6	97.4	103.6	116.9	102.4	98.0	97.3
October	100.0	99.0	98.0	103.6	119.4	102.5	98.2	95.8
November	100.0	99.8	98.3	103.6	119.3	102.6	98.2	97.2
December	100.4	100.6	98.6	103.6	118.4	102.5	98.2	98.9
Average, 1961	100.3	100.7	97.7	103.6	118.7	102.4	98.0	99.3

[1] Formerly titled "total fuels."
[2] Gas and electricity beginning January 1958, January 1958=100.

Source: Bureau of Labor Statistics, Monthly Labor Review.

TABLE 20.—Comparative fuel prices

Fuel	1960	1961
Bituminous coal:		
Average prices:		
Average retail price [1] ... dollars/net ton	17.06	17.12
Cost of coal at merchant coke ovens ... do	10.54	9.83
Anthracite, average sales realization per net ton at preparation plants, excluding dredge coal: [2]		
Chestnut ... dollars	10.89	11.36
Pea ... do	9.57	9.65
Buckwheat No. 1 ... do	8.54	8.55
Petroleum and petroleum products:		
Crude petroleum, average price per barrel at well ... do	2.88	[3] 2.89
Gasoline, average dealers' net price (excluding taxes) of gasoline in 55 U.S. cities [4] cents/gallon	16.08	15.80
Residual fuel oil:		
No. 6 fuel oil, average of high and low prices in Philadelphia [4] dollars/barrel (refinery)	2.90	3.01
Bunker C, average price for all Gulf ports [4] ... do	2.20	2.31
Distillate fuel oil:		
No. 2 distillate, average of high and low prices at Philadelphia [4] cents/gallon (refinery)	9.29	9.85
No. 2 distillate, average prices for all Gulf ports [4] ... do	8.61	9.17
Natural gas:		
Average U.S. value at well ... cents/thousand cubic feet	14.0	15.1
Average U.S. value at point of consumption ... do	50.1	51.0

[1] Bureau of Labor Statistics, published and unpublished data.
[2] New series, not comparable with previous series.
[3] Preliminary.
[4] Platt's Oil Price Handbook.

TABLE 21.—Indexes of major input expenses adjusted for productivity, mineral-fuel mining

(1957-59=100)

Year	Anthracite	Bituminous coal	Crude petroleum and natural gas
1952	116	105	81
1953	117	104	84
1954	99	94	88
1955	99	95	87
1956	96	99	91
1957	104	103	96
1958	102	98	103
1959	94	99	101
1960	88	96	100
1961	88	91	100

TABLE 22.—Indexes of relative labor cost, mineral-fuel mining

(1957-59=100)

Year	Index of labor costs per unit of output [1]			Index of value of product per man-period [2]			Index of labor costs per dollar of product [3]		
	Anthracite	Bituminous	Petroleum	Anthracite	Bituminous	Petroleum	Anthracite	Bituminous	Petroleum
1952	125	112	77	71	66	85	118	112	92
1953	127	111	81	78	72	90	116	111	90
1954	101	96	86	86	77	90	104	103	92
1955	100	96	85	77	79	94	114	103	92
1956	96	100	89	86	89	96	104	101	96
1957	107	104	95	92	96	105	106	101	92
1958	102	98	105	98	99	95	100	99	104
1959	91	98	101	109	105	100	94	100	104
1960	83	94	100	111	108	103	93	98	103
1961	82	86	100	115	114	108	90	92	103

[1] Anthracite and bituminous indexes based upon net tons per man per day (see coal chapters, this volume) and index of average earnings derived from Bureau of Labor Statistics data on hourly earnings; petroleum index based upon barrels per year (see petroleum section, this volume) and Bureau of Employment Security data on total wages in petroleum production.

[2] Anthracite and bituminous indexes based upon net tons per man per day and mine values of production, petroleum index based upon average employment and total value of production.

[3] Anthracite and bituminous indexes based upon index of value per man-day and index of average earnings petroleum index based upon total value of production and total wages.

TABLE 23.—Wholesale price indexes—selected machinery and equipment items

(1957-59=100)

Year	Oilfield machinery and tools	Mining machinery and equipment	Power cranes, draglines, shovels, etc.	Construction machinery and equipment	Specialized construction machinery
1952-56 (average)	84.9	74.9	81.4	81.0	84.4
1957	99.6	94.9	97.2	96.3	96.2
1958	100.1	100.2	99.9	100.1	100.0
1959	100.2	104.9	102.9	103.6	103.7
1960	100.3	106.4	105.1	105.8	106.9
1961	101.8	107.8	105.4	107.5	107.8
	Portable air compressors	Scrapers and graders	Contractor's air tools, handheld	Mixers pavers, spreaders, etc.	Tractors other than farm
1952-56 (average)	81.0	83.5	76.4	83.4	78.7
1957	95.3	96.3	93.0	95.7	95.8
1958	100.2	99.6	98.9	99.9	100.4
1959	104.6	104.0	108.2	104.4	103.9
1960	105.4	104.7	108.2	106.7	106.4
1961	114.1	104.4	113.5	108.6	108.0

Source: Bureau of Labor Statistics.

TABLE 24.—Cost of fuel in steam-electric power generation

(Cents per million Btu)

Region	Coal	Oil	Gas	Coal	Oil	Gas	Coal	Oil	Gas
	1956			1957			1958		
New England	38.8	41.4	37.9	41.0	46.9	40.7	40.1	40.7	37.8
Middle Atlantic	30.0	40.2	31.9	31.9	45.9	32.1	32.3	38.5	32.0
East North Central	24.6	74.3	21.7	25.8	68.2	23.1	25.8	68.5	24.6
West North Central	26.9	43.4	22.1	28.2	47.6	22.2	28.1	51.3	22.0
South Atlantic	28.1	39.5	25.2	29.0	46.2	25.8	28.6	39.7	27.6
East South Central	18.7	42.4	19.8	19.4	46.1	21.6	19.4	37.6	21.6
West South Central	15.2	40.4	12.4	14.9	41.7	12.9	15.6	41.8	12.9
Mountain	22.0	26.0	22.0	22.0	25.1	22.2	21.9	25.2	22.2
Pacific	------	33.0	25.0	------	41.5	26.5	------	42.0	26.5
Average, United States	26.2	37.9	18.5	27.5	44.4.	19.5	27.4	39.6	19.5
	1959			1960			1961		
New England	37.7	35.8	34.5	36.5	36.0	35.6	36.2	37.7	36.3
Middle Atlantic	30.8	35.5	33.0	30.0	35.1	35.7	29.9	36.2	37.7
East North Central	25.6	73.2	[1] 24.5	25.3	65.5	[1] 25.3	25.0	64.7	26.4
West North Central	27.5	46.7	22.4	27.0	43.4	23.0	26.2	47.4	22.8
South Atlantic	27.2	35.5	29.7	26.3	35.6	31.8	25.8	35.2	32.5
East South Central	19.1	47.1	23.4	19.6	50.3	24.8	19.7	50.9	25.4
West South Central	15.8	43.2	15.0	32.3	45.1	16.7	------	43.8	19.0
Mountain	21.3	24.3	25.7	20.2	25.0	27.8	19.6	25.6	28.5
Pacific	------	34.8	32.0	------	32.3	33.4	------	32.6	35.2
Average, United States	26.5	35.2	22.3	26.0	34.5	23.8	25.8	35.5	25.1

[1] Excludes blast-furnace gas, which would lower cost slightly.

Source: National Coal Association. Steam-Electric Plant Factors 1956 through 1961.

TABLE 25.—Average expenditure for paid leaves, premium pay practices, and legally required payments in mining industries, United States, 1960

Industry [1]	Percent of gross payroll					Cents per hour paid for				
	All establishments					All establishments				
	Total	Vacation	Holiday	Sick leave	Other [2]	Total	Vacation	Holiday	Sick leave	Other [2]
A. Paid leave:										
Crude petroleum and natural gas [3]	5.3	2.9	1.5	0.9	0.1	12.8	6.9	3.6	2.1	0.2
Crude petroleum and natural gas	8.2	4.4	2.2	1.4	.2	21.7	11.6	5.9	3.8	.4
Oil and gasfield services	2.0	1.1	.6	.2	(4)	4.4	2.5	1.4	.5	(4)
Bituminous coal and lignite mining	3.3	3.2	.1	(4)	(4)	9.8	9.6	.2	(4)	(4)
Anthracite mining	3.2	3.0	.1	(4)	(4)	8.4	8.0	.3	.1	(4)
Metal mining [3]	6.2	3.9	2.1	.2	(4)	17.1	10.7	5.8	.6	(4)
Mining and quarrying of nonmetallic minerals, except fuels	4.2	2.7	1.3	.2	(4)	9.1	5.9	2.9	.3	(4)
All industries	4.7	3.1	1.2	.4	(4)	12.0	7.8	3.0	1.1	.1

	Percent of gross payroll			Cents per hour paid for		
	All establishments			All establishments		
	Total	Overtime, weekend, and holiday work	Shift	Total	Overtime, weekend, and holiday work	Shift
B. Premium pay:						
Crude petroleum and natural gas [3]	6.8	6.6	0.2	16.5	16.0	0.5
Crude petroleum and natural gas	3.2	2.9	.3	8.4	7.5	.9
Oil and gasfield services	10.9	10.8	(4)	23.9	23.9	(4)
Bituminous coal and lignite mining	3.8	3.3	.4	11.2	9.9	1.3
Anthracite mining	3.3	3.0	.2	8.8	8.1	.7
Metal mining [3]	4.4	3.4	1.0	12.3	9.5	2.8
Mining and quarrying of nonmetallic minerals, except fuels	6.0	5.7	.3	13.1	12.4	.7
All industries	5.5	5.1	.4	14.0	13.0	1.0

	Percent of gross payroll					Cents per hour paid for				
	All establishments					All establishments				
	Total	Social security (OASDI)	Unemployment compensation	Workmen's compensation	Other [5]	Total	Social security (OASDI)	Unemployment compensation	Workmen's compensation	Other [5]
C. Legally required payments:										
Crude petroleum and natural gas [3]	7.2	2.5	1.0	3.6	(4)	17.4	6.1	2.5	8.8	(4)
Crude petroleum and natural gas	4.1	2.3	.7	1.1	(4)	10.9	6.2	1.8	2.9	(4)
Oil and gasfield services	10.5	2.7	1.5	6.4	(4)	23.4	5.9	3.2	14.2	(4)
Bituminous coal and lignite mining	7.0	2.5	1.8	2.7	----------	20.7	7.5	5.2	8.0	----------
Anthracite mining	8.5	2.8	2.8	2.9	----------	22.5	7.4	7.3	7.7	----------
Metal mining [3]	5.5	2.5	1.0	2.0	(4)	15.2	6.9	2.8	5.4	(4)
Mining and quarrying of nonmetallic minerals, except fuels	6.8	2.6	1.5	2.6	(4)	14.8	5.6	3.4	5.7	.1
All industries	6.8	2.5	1.3	3.0	(4)	17.3	6.4	3.4	7.5	(4)

[1] The classification is based on the Standard Industrial Classification Manual, U.S. Bureau of the Budget, 1957.

[2] Includes military, jury, witness, voting, and personal leave.

[3] Includes industries not shown separately.

[4] Less than 0.05 percent or 0.05 cent.

[5] Consists of State temporary disability insurance.

Source: Bureau of Labor Statistics, Monthly Labor Review, June 1962.

TABLE 26.—Expenditures for private welfare plans in mining in 1960

Industry [1]	Total	Health, accident, and life insurance	Pension and retirement plans	Vacation and holiday funds	Supplemental unemployment benefits	Severance or dismissal pay	Savings and thrift plans	Yearend and Christmas bonuses
	Percent of gross payroll (all establishments)							
Crude petroleum and natural gas [2]	5.7	1.0	3.0	(3)	----	0.2	1.1	0.4
Crude petroleum and natural gas	9.1	1.3	4.9	(3)	----	.5	1.9	.5
Oilfield and gasfield services	2.0	.7	.8	(3)	----	(3)	.1	.3
Bituminous coal and lignite mining	18.1	8.2	9.9	----	----	----	----	(3)
Anthracite mining	14.3	.4	13.9	----	----	----	----	(3)
Metal mining	7.0	3.5	2.9	----	0.4	(3)	----	.1
Mining and quarrying of nonmetallic minerals, except fuels	4.6	2.0	1.8	----	.1	(3)	.2	.7
All industries	8.8	3.3	4.6	(3)	.1	.1	.4	.3
	Cents per hour paid (all establishments)							
Crude petroleum and natural gas [2]	13.8	2.4	7.2	(3)	----	0.6	2.6	1.0
Crude petroleum and natural gas	23.8	3.5	12.8	(3)	----	1.3	5.0	1.3
Oilfield and gasfield services	4.4	1.5	1.8	(3)	----	(3)	.2	.8
Bituminous coal and lignite mining	53.8	24.3	29.4	----	----	----	----	.1
Anthracite mining	38.1	1.2	36.8	----	----	----	----	.1
Metal mining	19.4	9.8	8.1	----	1.1	.1	----	.3
Mining and quarrying of nonmetallic minerals, except fuels	9.9	4.3	4.0	----	.1	(3)	.4	1.5
All industries	22.4	8.3	11.7	(3)	.2	.3	1.1	.8

[1] The classification is based on the Standard Industrial Classification Manual, U.S. Bureau of the Budget, 1957.

[2] Includes industries not shown separately.

[3] Less than 0.05 percent or 0.05 cent.

Source: Bureau of Labor Statistics, Monthly Labor Review, June 1962.

INCOME AND INVESTMENT

National Income Originated.—There was a decline in income originating in mining as a whole and all its segments during the year. The decrease ranged from 10.5 percent in metal mining to 0.2 percent in nonmetallic mining and quarrying. Metal mining income in 1961 dropped back to its 1959 level, having risen 18.5 percent in 1960. Total national income showed a 3.0-percent year to year increase, down from the 3.7-percent increase in 1960. The mineral related industry products of petroleum and coal had a strong year to year growth in 1961 and outpaced the economy in general. Also, its growth rate accelerated in 1961, at a time when the rate of growth of the economy was decreasing. In 1961, income originating in mining and petroleum and coal products accounted for about 2 percent of total national income. This ratio is decreasing as the general economy grows faster than mining or the income of the mining industry actually decreases as it has in the last 2 years.

Investment.—Data on total investment in fuels are not available. Table 28 presents data on direct private investments abroad in the petroleum industry. The only information available on book values of domestic investments is that contained in the statistical summary of balance-sheet data from corporate-income tax returns. These reports are issued after a delay of 2 years. Data are not yet available for 1960. As compared with a total book value of $10.3 billion in foreign investments at the end of 1959 for petroleum industries, the total book value of crude petroleum and products (including coal products) was $46.8 billion. (To indicate the growth in domestic investment, the figure for fiscal 1952 was $28.9 billion.)

Indicated current rates of investment are given by figures on expenditures for new plant and equipment in the mining and manufacturing industries and by data on gross proceeds of new corporate security offerings. Expenditures for new plant and equipment recovered somewhat from the low point of 1958 in both mining and manufacturing.

TABLE 27.—National income by industrial origin, selected industries

Industry	1960 [1] (millions)	Change from 1959 [1] (percent)	1961 (millions)	Change from 1960 (percent)
All industries	415,480	+3.7	427,829	+3.0
Mining	5,207	−1.4	4,977	−4.4
Metal mining	763	+18.5	681	−10.7
Anthracite mining	94	−13.8	89	−5.3
Bituminous and other soft coal mining	1,151	−3.0	1,044	−9.3
Crude petroleum and natural gas	2,363	−7.1	2,332	−1.3
Nonmetallic mining and quarrying	836	+4.5	831	−.6
Manufacturing	121,987	+1.7	121,704	−.2
Products of petroleum and coal	4,230	+1.5	4,406	+4.2

[1] Revised figure.

Source: Office of Business Economics, U.S. Department of Commerce. Survey of Current Business, July 1962, table 7.

TABLE 28.—Direct private investment of the U.S. companies in foreign petroleum industries, 1961 [1]

(Million dollars; net inflows to the United States (—))

Country	Petroleum				All industries			
	Book value beginning of year	Net capital movements	Undistributed earnings of subsidiaries	Book value end of year	Book value beginning of year	Net capital movements	Undistributed earnings of subsidiaries	Book value end of year
Canada	2,667	99	51	2,841	11,198	297	284	11,804
Latin American Republics:								
Brazil	76	16	(1)	92	953	8	39	1,000
Central America and West Indies [2]	274	6	7	145	1,825	—3	6	951
Colombia	233	—7	3	229	424	—6	8	425
Mexico	32	16	(2)	48	795	45	8	822
Venezuela [3]	1,995	—42	12	2,371	2,569	4	38	3,017
Total [4]	2,882	26	39	3,247	8,365	141	221	8,166
Dependencies in Western Hemisphere	382	15	4	401	884	27	30	942
Europe	1,726	360	8	2,131	6,645	676	314	7,655
Africa [5]	407	96	17	491	925	122	51	1,070
Middle East	1,119	104	—8	1,191	1,163	108	—6	1,240
Far East	536	4	25	558	1,152	24	72	1,241
Oceania	372	44	7	423	994	88	20	1,101
International enterprises [6]	851	—1	16	866	1,418	—15	60	1,463
Grand total	10,944	747	159	12,151	32,744	1,467	1,046	34,684

[1] Less than $500,000.
[2] Cuba excluded in 1961; total, $956; petroleum, $147.
[3] Venezuela raised $406, revaluation of plant and equipment by a major oil company.
[4] Includes countries not shown above.
[5] South Africa adjusted down $36 as result of loss suffered by American mining company in liquidation of its South African operations.
[6] Includes shipping enterprises registered in Liberia and Panama but operating worldwide.

Source: Office of Business Economics, U.S. Department of Commerce. Survey of Current Business, August 1962.

TABLE 29.—Expenditures on new plant and equipment by firms in mining and selected mineral manufacturing industries

(Billion dollars)

Industry	1959	1960	1961	1961			
				January-March	April-June	July-September	October-December
Mining [1]	0.99	0.99	0.98	0.21	0.26	0.25	0.26
Manufacturing:							
Primary iron and steel	1.04	1.60	1.13	.28	.28	.26	.30
Primary nonferrous metals	.31	.31	.26	.07	.07	.06	.07
Stone, clay, and glass products	.53	.62	.51	.11	.12	.12	.16
Chemicals and allied products	1.23	1.60	1.62	.33	.42	.40	.46
Petroleum and coal products	2.49	2.64	2.76	.56	.70	.70	.80
Total, manufacturing	12.07	14.48	13.68	3.00	3.46	3.34	3.88

[1] Including fuels.

Source: Office of Business Economics, U.S. Department of Commerce. Survey of Current Business, March 1961, p. 14; March 1962, p. 7.

TABLE 30.—Estimated gross proceeds of new corporate securities offered for cash in the United States in 1961 [1]

Type of security	Total corporate		Manufacturing		Mining [2]	
	Value (millions)	Percent	Value (millions)	Percent	Value (millions)	Percent
Bonds	$9,425	72	$3,371	82	$166	63
Preferred stock	449	3	75	2	20	8
Common stock	3,273	25	666	16	76	29
Total	13,147	100	4,112	100	262	100

[1] U.S. Securities and Exchange Commission. Statistical Bulletin. V. 21, No. 6, June 1962, p. 4. Substantially all new issues of securities offered for cash sale in the United States in amounts over $100,000 and with terms to maturity of more than 1 year are covered in these data.

[2] Including fuels.

RESEARCH AND DEVELOPMENT

Although money spent on research and development may be a minor part of the total expenditure of an industry, it is probably its most significant expenditure in terms of its future health and growth. The National Science Foundation collects information on research and development expenditures in industry and annually publishes the results, with accompanying analysis, in Funds for Research and Development, and Scientific and Technical Personnel in Industry. Table 31 summarizes the data on funds expended and technical personnel employed in two mineral-fuels-related industries—chemicals and petroleum refining and extraction. For purposes of comparison, information on all industries is also shown.

Chemicals and petroleum accounted for about 13 percent of total research and development expenditures in 1959. Federal Government money accounted for almost 60 percent of total research and development expenditures in 1959, but these funds are concentrated in the aircraft and electrical-equipment industries. Only 9 percent of petroleum research and development expenditures were Federal funds. In the chemical industry the ratio of Government money was greater (30 percent), but it was still considerably less than the all-industries average.

In 1960 there were about 1½ million scientific and technical personnel employed by industry. About 14 percent of these people were in chemicals and petroleum. In both of these industries the ratio of scientists to total technical personnel is higher than the all-industry average. Of the technical personnel in the petroleum industry, 73 percent are classified as scientists, and in the chemical industry 70 percent are scientists; however, the rate for all industries is only 58 percent. It would be expected that the higher the ratio of scientists, the higher the ratio of basic research. National Science Foundation findings bear this out. In 1959 only 4 percent of research and development expenditures for all industries were classified as basic research. In chemicals, 11 percent of research and development expenditures were for basic research, while in petroleum, with the highest percentage of scientists (73 percent), basic research accounted for 18 percent of all research and development expenditures. The National Science Foundation has also found that it is the large companies in an industry who account for most of the research and development funds. In 1959, 93 percent of the research and development expenditures of the petroleum industry were made by companies with more than 5,000 employees.

TABLE 31.—Research and development activity

	Funds expended (million dollars)						Personnel employed[1]					
	Total		Company		Federal		Total		Scientists and engineers		Technicians	
	1958	1959	1958	1959	1958	1959	1959	1960	1959	1960	1959	1960
Petroleum refining and extraction	253	272	232	243	18	24	66, 100	66, 700	47, 900	48, 600	18, 200	18, 100
Percent of all industries	3. 0	2. 8	6. 7	6. 2	. 4	. 4	5. 0	4. 7	6. 3	6. 0	3. 3	3. 0
Chemicals and allied products	807	949	615	664	190	284	117, 500	130, 200	83, 100	90, 700	34, 400	39, 500
Percent of all industries	9. 7	9. 9	17. 7	17. 2	4. 0	5. 1	8. 9	9. 2	10. 9	11. 2	6. 3	6. 6
All industries	8, 295	9, 553	3, 479	3, 867	4, 759	5, 610	1, 313, 500	1, 406, 300	764, 100	812, 700	549, 400	593, 600

[1] Data are for January of each year.

Sources: National Science Foundation. Funds for Research and Development in Industry; Scientific and Technical Personnel in Industry.

TRANSPORTATION

The long-term trend in the transportation of bituminous coal, away from movement by rail, was halted, at least temporarily, in 1961. Movement by rail is still the dominant means of transporting coal. The railroads still move 73 percent of the coal, and in 1961 the average rail charge added 74 percent to the mine value of the coal.

Tables 33 and 34 give a fairly detailed picture of the movements of fuels and products by rail and water within the United States. Total tonnage moved by water showed no change from last year, but this masks divergent trends of product groups. A reduction in coal and residual fuel oil was offset by increased tonnages for crude and petroleum products; excluding gasoline, 90 percent of the fuels and products moved by the railroads last year was coal. Primarily because of a drop in the coal tonnage carried, the total fuels moved by rail dropped 4 percent from the 1960 level. Domestic rail freight rates for bituminous coal showed no change from a year ago, but anthracite rates dropped from the 1960 level back to the 1959 level. International tanker rates continued a downward trend begun after the Suez crisis.

TABLE 32.—Method of shipment of bituminous coal and lignite from mines, and used at mines, in the United States

	Method of shipment from mines			Used at mines [1]	Total production
	Shipped by rail and trucked to rail	Shipped by water and trucked to water	Trucked to final destination		
	Thousand net tons				
1957	380, 471	51, 171	50, 334	10, 728	492, 704
1958	305, 642	43, 899	50, 605	10, 300	410, 446
1959	300, 763	45, 954	52, 564	12, 747	412, 028
1960	303, 865	46, 784	52, 699	12, 164	415, 512
1961	294, 494	45, 400	51, 044	12, 039	402, 977
	Percentage of total				
1957	77. 2	10. 4	10. 2	2. 2	100. 0
1958	74. 5	10. 7	12. 3	2. 5	100. 0
1959	73. 0	11. 1	12. 8	3. 1	100. 0
1960	73. 1	11. 3	12. 7	2. 9	100. 0
1961	73. 1	11. 3	12. 6	3. 0	100. 0

[1] Includes coal used by mine employees, taken by locomotive tenders at tipples, used at mines for power and heat, transported from mines to point of use by conveyors or trams, made into beehive coke at mines, and all other uses at mines.

TABLE 33.—Rail transportation of mineral fuels and related products in the United States, by products [1]

(Thousand short tons)

Product	1959	1960	1961	Change from 1960 (percent)
Coal:				
Anthracite [2]	20, 358	16, 840	14, 963	−11
Bituminous	307, 226	304, 500	296, 884	−3
Coke	16, 155	16, 453	14, 328	−13
Crude petroleum	1, 531	1, 888	2, 027	+7
Gasoline	8, 172	7, 531	6, 861	−9
Distillate and residual fuel oil	8, 066	7, 279	6, 369	−13
Asphalt	2, 944	2, 734	2, 810	+3
Other [3]	15, 816	16, 013	15, 482	−3
Total	380, 268	373, 238	359, 724	−4

[1] Revenue freight originated, excluding forwarder and less than carload shipments, for which categories commodity detail is not available.

[2] Includes shipments to washeries and breakers.

[3] Lubricants, petroleum products, and gases.

Source: Interstate Commerce Commission, Freight Commodity Statistics, Class I Steam Railways in United States, for years ended Dec. 31, 1959, 1960, and 1961.

TABLE 34.—Water transportation of mineral fuels and related products in the United States, by products [1]

(Thousand short tons)

Product	1959	1960	1961 [2]	Change from 1960 (percent)
Coal:				
Anthracite	814	633	320	−49
Bituminous	130,038	132,230	127,197	−4
Coke	285	448	331	−26
Crude petroleum	72,356	74,138	78,302	+6
Gasoline	93,021	92,618	92,513	----------
Distillate fuel oil	73,192	74,004	77,979	+5
Residual fuel oil	45,265	49,665	44,988	−9
Asphalt	4,118	3,801	4,042	+6
Kerosine	9,325	9,255	9,147	−1
Other [3]	12,146	14,830	15,745	+6
Total	440,560	451,622	450,564	----------

[1] Domestic traffic; that is, traffic with Canal Zone, the Virgin Islands, and military cargoes carried in Defense Department vehicles are excluded.
[2] Preliminary figure.
[3] Includes lubricants, jet fuel, naphthene, and briquets.

Source: Department of the Army. Waterborne Commerce of the United States, Calendar year 1960, pt. 5, National Summaries.

TABLE 35.—Freight costs in domestic and international trade

Year	Domestic,[1] average revenue per ton (dollars)		Foreign [2] (1953=100)	
	Anthracite (n.o.s.)	Bituminous coal	Dry cargo time charter	Tanker
1953	3.35	3.33	100	100
1954	3.31	3.23	118	80
1955	3.33	3.24	214	83
1956	3.39	3.45	285	103
1957	3.52	3.57	198	109
1958	3.68	3.58	92	92
1959	3.65	3.45	92	82
1960	3.70	3.40	108	74
1961	3.65	3.40	120	70

[1] Interstate Commerce Commission, Bureau of Transport Economics and Statistics. Freight Commodity Statistics, June 1962.
[2] United Nations. Monthly Bulletin of Statistics, June 1962.

DISTRIBUTION OF BITUMINOUS COAL AND LIGNITE

Tables 36, 37, and 38 summarize the distribution of bituminous coal and lignite in 1961 from coal-producing districts of origin to States of destination, by methods of transportation and types of consumer use. This information shows the participation of the bituminous coal and lignite industry in the various energy markets of the Nation, both locally and nationally. It also provides benchmarks for special studies and analyses of the many factors that influence coal production and its utilization in the highly competitive energy market.

The information is based upon reports submitted to the Bureau of Mines voluntarily by producers, sales agents, distributors, and wholesalers who normally produce or sell 100,000 tons or more annually. The unprecedented cooperation of these respondents resulted in their reporting about 94 percent of all coal produced or shipped during the year. To account for total industry shipments, estimates for the remaining shipments are included, based on data from coal trade and other reliable coal statistical reporting agencies.

Details of the distribution survey are shown in Bureau of Mines Mineral Market Report 3368.

TABLE 36.—Distribution of bituminous coal and lignite, 1961, by method of movement and consumer use

(Thousand net tons)

Shipments	Consumer use					
	Electric utilities	Coke and gas plants	Retail dealers	All others	Railroad fuel	Used at mines and sales to employees
Total shipments to all destinations in the United States, Canada, and Mexico by all methods of movement and consumer use, and oversea exports	176,984	78,813	29,312	90,680	1,876	1,366
Shipments to all destinations in the United States, Canada, and Mexico by specific method of movement and consumer use:						
Methods of movement:						
All-rail	82,442	34,666	18,904	57,742		
River and ex-river	43,938	23,513	1,032	5,746		
Great Lakes [1]	13,179	14,169	4,778	11,482		
Tidewater [2]	13,749	5,584	298	1,572		
Truck	12,766	420	4,300	13,974		
Tramway, conveyor, and private railroad	10,910	461		164		
Methods of movement and/or consumer uses unknown					1,876	1,366
Total	176,984	78,813	29,312	90,680	1,876	1,366

Shipments	Canadian Great Lakes commercial docks [3]	U.S. Great Lakes dock storage [3]	U.S. tidewater dock storage [3]	Oversea exports [4]	Net change in mine inventory	Total
Total shipments to all destinations in the United States, Canada, and Mexico by all methods of movement and consumer use, and oversea exports	1,213	−718	19	23,780	−63	403,262
Shipments to all destinations in the United States, Canada, and Mexico by specific method of movement and consumer use:						
Methods of movement:						
All-rail						193,754
River and ex-river						74,229
Great Lakes [1]						43,608
Tidewater [2]						21,203
Truck						31,460
Tramway, conveyor, and private railroad						11,535
Methods of movement and/or consumer uses unknown	1,213	−718	19	23,780	−63	27,473
Total	1,213	−718	19	23,780	−63	403,262

---

[1] Excludes shipments to Canadian Great Lakes commercial docks and U.S. dock storage for which consumer uses are not available; however, includes vessel fuel, the destinations of which are not available.

[2] Excludes oversea exports and U.S. tidewater dock storage for which consumer uses are not available; however, includes bunker fuel, the destinations of which are not available.

[3] Consumer use unknown.

[4] Excludes Canada; consumer use unknown.

TABLE 37.—Distribution of bituminous coal and lignite, 1961, by district of origin and consumer use

(Thousand net tons)

District of origin[1]	Consumer use					
	Electric utilities	Coke and gas plants	Retail dealers	All others	Railroad fuel	Used at mines and sales to employees
1	15,878	3,066	840	7,544	214	189
2	7,200	19,750	735	6,774	20	108
3 and 6	23,171	6,351	1,033	8,327	131	17
4	19,660	21	1,871	9,439	310	70
7	1,834	13,119	3,491	3,057	67	171
8	34,300	24,805	11,192	27,128	322	634
9	22,779	14	2,573	4,434	86	2
10	27,194	734	3,874	13,331	376	57
11	9,090		891	4,767	138	39
12	516		37	392		
13	7,334	5,392	222	997	4	7
14		747	1	117		
15[2]	2,632	40	283	1,016	60	
16	476		117	227		10
17	666	1,992	304	299	2	6
18	36		18	80		7
19	1,608		190	608	93	8
20	576	2,782	1,044	847	11	20
21	1,561		478	588	40	10
22 and 23	473		118	708	2	11
Total	176,984	78,813	29,312	90,680	1,876	1,366

District of origin[1]	Canadian Great Lakes commercial docks[3]	U.S. Great Lakes dock storage[3]	U.S. tidewater dock storage[3]	Oversea exports[4]	Net change in mine inventory	Total
1	46		8	705	76	28,566
2	3	−4			−8	34,578
3 and 6	192	−16	1	690	−149	39,748
4	236	−277			21	31,351
7	1	−74	3	11,430	−92	33,007
8	735	−315	7	10,925	81	109,814
9		−49			−101	29,738
10		13			128	45,707
11		4			−4	14,925
12						945
13				30	6	13,992
14						865
15[2]					−7	4,024
16					−3	827
17					−4	3,265
18						141
19					4	2,511
20					−9	5,271
21					1	2,678
22 and 23					−3	1,309
Total	1,213	−718	19	23,780	−63	403,262

---

[1] Producing districts are defined in Mineral Market Report 3368, March 1962.
[2] Excludes Texas.
[3] Consumer use unknown.
[4] Excludes Canada, consumer use unknown.

TABLE 38.—Distribution of bituminous coal and lignite, 1961, by destination and consumer use

(Thousand net tons)

Destination	Consumer use				
	Total	Electric utilities	Coke and gas plants	Retail dealers	All others[1]
New England:					
Massachusetts	4,014	2,672	--------	277	1,065
Connecticut	3,956	3,109	475	62	310
Maine, New Hampshire, Vermont, and Rhode Island	1,704	942	--------	114	648
Middle Atlantic:					
New York	21,092	10,525	3,782	435	6,350
New Jersey	6,455	4,323	563	67	1,502
Pennsylvania	44,529	15,913	19,420	1,139	8,057
East North Central:					
Ohio	44,998	20,243	9,129	2,913	12,713
Indiana	31,894	13,730	10,755	2,029	5,380
Illinois	37,479	19,182	2,774	5,696	9,827
Michigan	24,327	9,997	4,121	2,514	7,695
Wisconsin	12,580	5,047	348	3,045	4,140
West North Central:					
Minnesota	5,891	2,796	521	988	1,586
Iowa	4,439	1,857	--------	792	1,790
Missouri	6,847	3,704	71	1,021	2,051
North Dakota and South Dakota	2,425	1,369	--------	654	402
Nebraska and Kansas	1,318	528	--------	196	594
South Atlantic:					
Delaware and Maryland	9,351	4,129	4,130	214	878
District of Columbia	968	412	--------	145	411
Virginia	12,343	6,707	77	1,132	4,427
West Virginia	14,661	6,493	4,100	250	3,818
North Carolina	9,295	6,092	--------	834	2,369
South Carolina	3,800	1,907	--------	270	1,623
Georgia and Florida	4,898	4,085	--------	315	498
East South Central:					
Kentucky	11,340	7,308	1,531	831	1,670
Tennessee	13,588	10,583	232	837	1,936
Alabama and Mississippi	15,843	9,225	5,478	195	945
West South Central: Arkansas, Louisiana, Oklahoma, and Texas	802	---------	514	45	243
Mountain:					
Colorado	3,242	1,409	998	280	555
Utah	3,046	552	1,888	251	355
Montana and Idaho	1,045	267	--------	478	300
Wyoming	1,328	1,143	--------	56	129
New Mexico	138	33	--------	35	70
Arizona and Nevada	133	3	--------	17	113
Pacific:					
Washington and Oregon	992	---------	--------	397	595
California	2,170	---------	2,121	6	43
Alaska	710	206	--------	66	438
Canada	9,859	122	5,257	647	3,833
Mexico	55	---------	--------	--------	55
Destinations not revealable	1,148	371	528	69	180
Destination and/or consumer uses not available:					
Great Lakes movement:					
Canadian commercial docks	1,213	---------	--------	--------	--------
Vessel fuel	1,083	---------	--------	--------	--------
U.S. dock storage	−718	---------	--------	--------	--------
Tidewater movement:					
Oversea exports (except Canada)	23,780	---------	--------	--------	--------
Bunker fuel	3	---------	--------	--------	--------
U.S. dock storage	19	---------	--------	--------	--------
Railroad fuel:					
U.S. companies	1,782	---------	--------	--------	--------
Canadian companies	94	---------	--------	--------	--------
Coal used at mines and sales to employees	1,366	---------	--------	--------	--------
Net change in mine inventory	−63	---------	--------	--------	--------
Total	403,262	---------	--------	--------	--------

---

[1] Excludes vessel and bunker fuel, the destinations of which are not available.

GOVERNMENT ACTIVITIES

Oil-Import Program.—As a result of increased imports of crude petroleum and products in late 1958 and early 1959 under the Voluntary Oil-Import Program, the President, upon a finding that such imports threatened to impair the national security, issued Proclamation 3279 on March 10, 1959, which established a mandatory program for adjusting imports of petroleum and petroleum products into the United States. The latter program (1) established a maximum level of imports in districts I–IV of crude oil, unfinished oils, and finished products, except residual fuel oil, at 9 percent of total demand; (2) limited imports of residual fuel oil into District I to an amount that when added to domestic production would approximate total demand; (3) limited imports of crude oil, unfinished oils, and finished products into District V to an amount that, when added to domestic production and supply, would approximate total demand; and (4) limited imports of crude oil, unfinished oils, and finished products into Puerto Rico to the amount brought in during 1958. No changes in the program were made during 1961.

National Fuels Study.—Senate Joint Resolution 105 (87th Cong., 1st sess., March 1961) authorized the creation of a Special Committee on the National Fuels Study, consisting of 12 Senators. The resolution directed the committee to (1) investigate the present and future demand and supply of fuel and energy resources in the United States, (2) review existing laws and Government policies as they affect the energy economy, and (3) evaluate the desirability of a national fuels policy. The final report is to be submitted not later than January 2, 1963. Work was started in 1961 on the factual aspects of the study, and a status report was submitted late in the year.

Office of Coal Research.—The Office of Coal Research, established in the Department of Interior in 1960 for the purpose of awarding contracts to encourage applied research in coal utilization, made its first two contract awards in 1961. The General Technical Advisory Committee, whose purpose it is to advise the Government on the selection of projects, was appointed and met for the first time in June 1961. It is a 16-man committee of private experts from universities, industry, and labor. The purpose of the Office is to support research which will quickly stimulate the demand for coal.

Mine Water Control.—Since the inception of the Federal-State Mine Water Control Program established in 1955 between the Federal Government and the State of Pennsylvania, 29 projects have been approved. Four were canceled, and three have been terminated. One surface drainage project was approved during 1961.

WORLD REVIEW

U.S. Trade.—Exports of mineral fuels and products showed little change from the 1960 level. Two-thirds of all fuel exports fall into two Standard International Trade Classification (SITC) categories, coal and lubricating oils. While coal exports experienced an $11 million year-to-year decline, exports of lube oils increased by the same amount. Fuel imports increased about 6 percent, after having fallen steadily since 1958, but 1961 imports were still below the 1958 high. Imports of crude and fuel oils comprise 95 percent of total fuel imports, with the value of crude being double the value of fuel oils. Imports of both rose about 5 percent during the year.

The value of fuel imports was almost exactly twice the value of fuel exports in 1961. As recently as 1957, exports exceeded imports by 17 percent. Imports have not changed greatly during this time, but exports have declined dramatically. In 1957 they were $1.8 billion; in 1961 they were $0.8 billion. Coal exports dropped almost $0.5 billion, and exports of crude, light oils, and heavy oils declined more than $0.5 billion. These two together decreased more than the total decline, as exports of some items have increased since 1957.

Canada and Japan are the two most important importers of American coal, purchasing a little more than 50 percent of U.S. exports of 35 million tons in 1961. Exports to countries of the Organisation for European Economic Cooperation were 13.5 million tons. Exports to both Canada and the OEEC countries declined in 1961, while exports to Japan increased about 1 million tons.

World Production.—World production of crude oil increased during the year, while coal production decreased. There are no statistics on world production of natural gas, but production did increase in both the United States and Western Europe. Table 40 shows world production, U.S. production, and U.S. consumption of the major fuels. In both production and consumption, the U.S. percentage of the world total is declining. But the United States is still the world's leading crude oil producer, accounting for almost one-third of the world production, and 15 percent of the world's bituminous coal is produced in the United States. The UN indexes of fuel production show an increase in crude oil and natural gas production in all regions. The biggest percentage increase was in Asia, which is dominated by the Near East production. Coal production decreased in North America and Europe but showed increases in Latin America and Asia. These UN indexes do not include the centrally planned economies. If China were included in the UN index, the coal component for Asia would have shown a decline in 1961, as China's production decreased from 420 to 380 million tons. Five countries, the United States, the U.S.S.R., China, the United Kingdom, and Germany, account for about 75 percent of world production of bituminous coal and anthracite.

Table 42 shows the production of electricity and mineral fuels in various Western European countries. U.S. production is also shown in order to give perspective to the European figures. Production of electricity in Western Europe is growing faster than in the United States, but it is still less than two-thirds of the U.S. total. As in the United States, coal production showed a declining trend, but the rate of decline has been much less in Europe than in this country. Production of crude and natural gas in Europe is small. European crude production in 1961 was only 4 percent of the U.S. quantity, and about 40 percent of this came from Germany. Production of natural gas in Europe was also about 4 percent of the U.S. figure, and Italy and France account for about 85 percent of European production. Although the amount of gas production is small, in 1961 it was seven times 1952 production.

Consumption.—Total energy consumption in Europe is somewhat more than half of U.S. consumption, but it is growing faster. European energy consumption grew less in 1961 than in 1960, 5 percent, down from 8 percent in 1960. All segments except coal showed strong growth in 1961, 16 percent for natural gas and 13 percent for petroleum and hydro. The components of the European energy economy differ greatly from the U.S. pattern. Almost 60 percent of European energy is still supplied by coal, although coal's dominance is declining. Only 1 percent of the energy is produced from gas: in the United States, the figure is over 30 percent. Hydroelectricity is more important in Europe than it is in the United States. Sixteen percent of European energy is derived by waterpower, as against 6 percent in the United States.

TABLE 39.—Value of imports and exports, mineral fuels and products [1]

(Thousand dollars)

SITC No.	Group and commodity	Imports for consumption [2]			Exports of domestic merchandise		
		1959	1960	1961	1959	1960	1961
311-01	Coal: Anthracite, bituminous, subbituminous, lignite	2,455	1,860	1,370	378,204	353,929	341,423
311-02	Coke: Coal and lignite	1,441	1,483	1,543	8,674	6,831	8,213
311-03	Briquets: Coal, lignite, coke, and peat	3	390	370	495	305	176
	Total: Coal and related products	3,899	3,733	3,283	387,373	361,065	349,812
312-01	Petroleum, crude and partly refined for further refining	940,543	957,822	1,009,618	13,829	16,663	18,505
313-01	Motor spirit (gasoline and other light oils for similar uses), including gasoline blending agents	64,644	10,847	7,367	108,757	82,578	56,444
313-02	Lamp oil and white spirit (kerosine, illuminating oil)	536	224	1,524	5,632	3,673	1,992
313-03	Gas, diesel, and other fuel oils	505,220	513,537	540,124	91,838	78,780	58,169
313-04	Lubricating oils and greases, including mixtures with animal and vegetable lubricants	35	348	364	189,051	212,752	222,242
313-05	Mineral jelly and waxes, including petrolatum	2,055	1,682	2,250	28,564	32,627	30,791
313-09	Pitch, resin, petroleum asphalt, coke of petroleum and other byproducts of coal, lignite, petroleum and oil shale, including mixtures with asphalt, n.e.s., not chemicals	19,553	16,611	18,009	30.949	40,311	42,844
314-01	Gas, natural	26,329	28,372	44,733	6,263	3,630	39,446
314-02	Gas, manufactured	--------	--------	--------	6,791	9,646	13,322
	Total: Petroleum and related products	1,558,915	1,529,443	1,623,989	481,674	480,660	483,755
	Total fuels	1,562,814	1,533,176	1,627,272	869,047	841,725	833,567
	Total nonfuels (includes scrap but excludes wrought metals)	1,863,497	[3] 1,793,690	1,711,849	561,667	1,078,481	1,092,307
	Total minerals	3,426,311	3,326,866	3,339,121	1,430,714	1,920,206	1,925,874

[1] Grouping of commodities based upon Standard International Trade Classification of United Nations. Basic data compiled by Office of Chief Economist, Bureau of Mines, from supplement to Annual Statistical Bulletin, Series IV, by Organization for European Economic Cooperation, which represents conversion of U.S. import and export classification to SITC categories. Actual import and export data from U.S Department of Commerce reports FT-110 and FT-410. Since SITC data may differ from that used by Bureau of Mines, values shown may not compare with those in commodity chapters.

[2] Includes items entered for immediate consumption, withdrawn from bonded storage warehouses for consumption, and withdrawn from bonded smelting and refining warehouses for consumption or export.

[3] Revised figure.

World Trade Prices.—The various fuel price indexes compiled by the United Nations showed little change from recent trends. Petroleum products in the United Kingdom and gasoline prices in the United States increased by 10 percent. Prices of crude and coal were steady or down except for West Texas sour, which regained its 1957–58 average. The differential movement between crude and product prices in 1961 indicates a decrease of the pressure on refiners' margins.

TABLE 40.—World production; U.S. production and consumption

	World production	U.S. production		U.S. apparent consumption	
		Amount	Percent of world production	Amount	Percent of world production
	1960				
Crude petroleum........thousand barrels..	7,674,493	2,574,933	33	2,952,534	38
Natural gas............million cubic feet..	(1)	12,771,038	(1)	12,509,427	(1)
Bituminous and lignite....thousand tons..	2,714,171	415,512	15	380,429	14
Anthracite........................do....	192,300	18,817	10	17,600	9
	1961				
Crude petroleum........thousand barrels..	8,187,986	2,621,758	32	2,987,158	36
Natural gas............million cubic feet..	(1)	13,254,025	(1)	13,081,714	(1)
Bituminous and lignite....thousand tons..	2,689,538	402,977	15	374,405	14
Anthracite........................do....	190,800	17,446	9	15,900	8

[1] Data not available.

TABLE 41.—Index of world production: Coal, crude petroleum, and natural gas

(1953=100)

	Free world	North America [1]	Europe [2]	Latin America [3]	Asia [4]
	Coal				
1957..........................	104	104	103	111	113
1958..........................	99	86	101	118	111
1959..........................	96	86	97	122	109
1960..........................	96	86	95	133	117
1961 [5]......................	96	82	94	153	126
	Crude petroleum and natural gas				
1957..........................	125	115	189	152	294
1958..........................	125	108	203	147	322
1959..........................	134	113	235	156	363
1960..........................	151	114	270	164	397
1961 [5]......................	165	117	306	170	428

[1] Canada and United States.
[2] Excluding Albania, Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, Rumania, and U.S.S.R.
[3] Central and South America and Caribbean Islands.
[4] Afghanistan, Brunei, Burma, Ceylon, Singapore and the Federation of Malaya, Hong Kong, India, Indonesia, Iran, Japan, Republic of Korea, Pakistan, Philippines, Sarawak, China (Taiwan), Thailand, and the Republic of Vietnam.
[5] Preliminary figure.

Source: UN Monthly Bulletin of Statistics, May 1962.

TABLE 42.—Monthly average of production of electricity and mineral fuels in selected OECD countries

Product	United States	European members OECD	United Kingdom	Germany, West	France	Italy	Spain	Netherlands	Belgium	Austria
Electric power (billion kilowatt-hours):										
1952	38.6	23.5	5.2	4.4	3.2	2.6	0.8	0.7	0.8	0.5
1953	42.8	24.8	5.5	4.8	3.2	2.7	.8	.8	.8	.6
1954	45.4	27.4	6.1	5.2	3.6	3.0	.9	.8	.9	.6
1955	51.9	29.8	6.7	5.8	3.9	3.2	1.0	.9	.9	.7
1956	56.9	32.5	7.3	6.5	4.2	3.4	1.2	1.0	1.0	.8
1957	59.6	34.4	7.6	7.8	4.5	3.6	1.2	1.1	1.1	.8
1958	60.3	36.7	8.2	8.1	4.9	3.8	1.3	1.1	1.0	.9
1959	66.2	39.0	8.8	8.7	5.2	4.0	1.4	1.2	1.1	1.0
1960	70.0	43.5	9.9	9.6	5.9	4.5	1.5	1.3	1.2	1.1
1961	73.1	46.6	10.6	10.2	6.1	4.9	1.7	1.4	1.2	1.1
Hard coal (million metric tons):										
1952	38.36	40.50	19.17	11.62	4.61	.09	1.01	1.04	2.53	-------
1953	36.91	40.20	18.98	11.74	4.38	.09	1.02	1.03	2.51	-------
1954	31.69	40.60	18.97	12.07	4.53	.09	1.03	1.01	2.44	-------
1955	37.40	40.70	18.76	12.33	6.41	.10	1.03	.99	2.50	-------
1956	39.89	41.10	18.80	12.62	4.59	.09	1.07	.99	2.46	-------
1957	38.94	41.20	18.93	12.47	4.73	.09	1.16	.95	2.42	-------
1958	31.75	40.50	18.27	12.41	4.81	.06	1.20	.99	2.26	-------
1959	32.19	38.60	17.45	11.81	4.80	.06	1.14	1.00	1.90	-------
1960	32.39	37.50	16.46	11.86	4.66	.06	1.15	1.04	1.87	-------
1961	31.21	36.90	16.13	11.90	4.36	.06	1.15	1.05	1.79	-------
Crude petroleum (million metric tons):										
1952	25.79	.48	-------	.15	.03	.01	-------	.06	-------	.23
1953	26.54	.54	-------	.18	.03	.01	-------	.07	-------	.25
1954	26.09	.63	-------	.22	.04	.01	-------	.08	-------	.28
1955	27.98	.76	-------	.26	.07	.02	-------	.09	-------	.31
1956	29.48	.85	-------	.29	.11	.05	-------	.09	-------	.29
1957	29.49	.97	-------	.33	.12	.11	-------	.13	-------	.27
1958	27.57	1.01	-------	.37	.12	.13	-------	.14	-------	.24
1959	28.99	1.08	-------	.43	.14	.14	-------	.15	-------	.21
1960	29.00	1.19	-------	.46	.16	.17	-------	.16	-------	.20
1961	29.52	1.26	-------	.52	.18	.16	-------	.17	-------	.20
Natural gas (billion cubic meters):										
1952	18.91	.18	-------	.01	.02	.12	-------	-------	-------	[1] .03
1953	19.81	.26	-------	.01	.02	.19	-------	-------	-------	[1] .04
1954	20.63	.33	-------	.01	.02	.25	-------	-------	-------	[1] .04
1955	22.19	.41	-------	.02	.02	.30	-------	-------	-------	.06
1956	23.79	.49	-------	.03	.03	.37	-------	-------	-------	.06
1957	25.20	.56	-------	.03	.05	.42	-------	-------	-------	.06
1958	26.03	.62	-------	.03	.09	.43	-------	-------	-------	.07
1959	27.08	.85	-------	.03	.22	.51	-------	-------	-------	.09
1960	30.03	1.07	-------	.04	.37	.54	-------	-------	-------	.12
1961	30.91	1.24	-------	.04	.50	.57	-------	-------	-------	.13
Coking coal (million metric tons):										
1952	5.2	6.78	1.45	3.44	.79	.20	.09	.27	.53	.13
1953	6.0	6.74	1.48	3.46	.74	.20	.09	.27	.50	.13
1954	4.5	6.65	1.52	3.23	.79	.22	.10	.28	.51	.14
1955	5.7	7.42	1.53	3.72	.92	.25	.12	.33	.55	.15
1956	5.6	8.07	1.66	3.98	1.04	.28	.13	.35	.61	.17
1957	5.7	8.37	1.73	4.15	1.07	.31	.16	.35	.60	.18
1958	4.0	7.98	1.56	3.99	1.06	.28	.17	.34	.58	(2)
1959	4.1	7.54	1.44	3.57	1.12	.27	.20	.34	.60	(2)
1960	4.3	7.99	1.60	3.73	1.14	.31	.21	.38	.63	(2)
1961	3.9	7.85	1.51	3.71	1.10	.32	.22	.38	.60	(2)
Lignite (million metric tons):										
1952	-------	7.86	-------	6.95	-------	.07	.13	-------	-------	.43
1953	-------	8.02	-------	7.05	-------	.06	.15	-------	-------	.47
1954	-------	8.37	-------	7.32	-------	.05	.15	-------	-------	.52
1955	-------	8.64	-------	7.53	-------	.04	.15	-------	-------	.55
1956	-------	9.09	-------	7.94	-------	.03	.16	-------	-------	.56
1957	-------	9.33	-------	8.07	-------	.03	.21	-------	-------	.57
1958	-------	9.09	-------	7.79	-------	.07	.22	-------	-------	.54
1959	-------	9.07	-------	7.79	-------	.10	.18	-------	-------	.52
1960	-------	9.24	-------	7.98	-------	.06	.15	-------	-------	.50
1961	-------	9.45	-------	8.10	-------	.13	.17	-------	-------	.47

---

[1] Producers' shipments.

[2] Not available.

Source: General Statistics, Organization for Economic Cooperation and Development. Statistical Bulletins, May 1962.

TABLE 43.—Energy consumption: United States and Western Europe

	1959 [1] (millions of tons of coal equivalent)	Index (preceding year=100)	
		1960	1961 [2]
Total commercial energy:	2,106	105	103
Western Europe	750	108	105
United States	1,356	104	102
Hard coal:	767	104	99
Western Europe	435	103	99
United States	332	104	98
Petroleum:	698	106	104
Western Europe [3]	183	117	113
United States	515	102	101
Natural gas:	433	107	106
Western Europe [4]	11	131	116
United States	422	106	106
Hydroelectricity:	208	105	110
Western Europe [4]	121	105	113
United States	87	106	104

[1] Converted at following rates: 1 ton of coal equals 0.77 ton of petroleum, 0.769 cubic meter of natural gas, and 1,670 kilowatt-hours of hydroelectricity.
[2] Preliminary.
[3] Excluding bunkers.
[4] Year ending in September of year stated.

Source: UN Commodity Survey, 1961, April 1962.

TABLE 44.—World-trade price indexes

(1957-59=100)

Mineral	1955	1956	1957	1958	1959	1960	1961
Crude petroleum:							
Kuwait	96.7	96.7	101.2	104.0	94.9	92.2	89.4
Saudi Arabia	95.7	95.7	101.7	103.1	95.2	92.3	89.2
United Kingdom	90.6	103.0	112.8	98.2	89.1	84.4	81.1
United States:							
West-Texas Sour	92.6	92.6	101.4	101.4	97.2	96.9	101.6
Refugio-Light	92.1	92.1	104.0	99.6	96.6	96.6	96.6
Saudi Arabian	91.5	102.1	109.9	99.3	90.7	85.4	82.1
Venezuelan	95.5	95.8	103.8	102.0	94.3	92.2	91.6
Venezuela:							
Export price f.o.b. Puerta La Cruz	94.0	94.2	102.1	102.5	95.5	94.1	94.1
Export price f.o.b. Amuay	92.8	92.8	102.5	102.9	94.5	92.8	92.8
Petroleum products:							
United Kingdom	83.0	91.1	110.7	94.0	95.4	98.3	110.5
U.S. distillate No. 2	96.3	99.6	107.4	95.1	97.4	91.7	98.5
U.S. gasoline	101.3	100.3	105.2	97.5	97.5	99.4	109.0
Coal:							
Canada	88.5	94.5	99.0	100.5	100.5	100.5	99.0
Germany	85.8	91.2	96.8	101.6	101.6	104.9	104.9
United Kingdom	86.5	112.8	122.3	98.4	79.4	72.2	71.4
United States	84.0	94.1	103.0	100.1	96.8	95.6	92.9

Source: United Nations. Monthly Bulletin of Statistics, July 1962, table 47.

COMPARISON OF BUREAU OF MINES AND BUREAU OF CENSUS 1958 DATA—MINERAL FUELS PRODUCTION [3]

This section compares Bureau of Mines mineral production data for 1958 with those of the Bureau of the Census, U.S. Department of Commerce, as presented in its reports of the 1958 Census of Mineral Industries. The two agencies cooperated in conducting the 1958 Census of Mineral Industries so that comparable coverage and, so far as feasible, unduplicated results would be obtained. Joint forms were not used in 1958.

---

[3] Prepared by Mary S. Lanier, research assistant, Office of Chief Statistician.

The Bureau of Mines and the Bureau of the Census cooperated in developing a table comparing the basic statistics tabulated by the separate agencies. The comparison of quantity and value data for each mineral or mineral commodity has been designed and explained where necessary so that users of the statistics can understand any major differences. The comparison also provides an approximate measure of the extent to which coverages of the two agencies match. The comparative table also includes industry shipments and receipts data from the Census reports to afford readers (1) an approximate measure of the extent to which a particular commodity is produced in the industry to which it is primary, and (2) information of the extent to which that industry produces other commodities. "Total industry value of shipments and receipts" are in excess of the sum of the total shown for "Primary products" and for "Secondary products, services, and resales" because of the inclusion in the former of all intercompany transfers.

Volume I of the 1961 Minerals Yearbook contains a chapter (Mineral production, comparison of Bureau of Mines and Bureau of Census 1958 data) which gives a detailed comparison for all minerals. The table is accompanied by an explanation of differences between the two.

Anthracite.—The Bureau of Mines statistics on both production and shipments are based primarily on data reported by breakers, washeries, and dredges, but they also include some coal sold for use without preparation. The quantity and value of the coal so reported is then distributed among the counties from which the coal originated. The Census statistics are on an establishment basis and take into account the actual location and type of product of the establishment as reported by the respondent, making a distinction between "net production" and "net shipments." The Bureau of Mines statistics therefore are comparable by county only with the Census statistics for "net production" and are not comparable with the Census county figures for "net shipments."

Both agencies collect information on coal shipped for use as raw coal and on raw coal shipped for preparation, as well as on the prepared product. The Census Bureau total for quantity of coal shipped for use as raw coal is much larger than the total reported to the Bureau of Mines.

Bituminous Coal and Lignite.—The Bureau of Mines statistics on both production and shipments are based primarily on data furnished by producers. These data are supplemented, however, by data from various State mine department records and, in a few instances, from railroad carloadings, in order to obtain coverage of production not directly reported. The Bureau of Mines figures represent the quantity and value of net marketable coal produced, excluding washery and other refuse. The Census statistics are on an establishment basis, making a distinction between "net production" and "net shipments."

Both the Bureau of Mines and the Bureau of the Census collect information on mechanical cleaning of coal. However, the Bureau of Mines credits the clean coal to the location or locations at which the coal was mined, whereas the Census statistics show the clean coal shipped according to the location of the cleaning plant. The Census clean-coal statistics represent mechanical cleaning at plants operated in conjunction with mines and at separately operated cleaning plants (these are included in the bituminous coal industry) and exclude figures for coal cleaning at preparation plants operated as parts of coke ovens or other manufacturing establishments. The Bureau of Mines includes data for these consumer-operated plants in its statistics on mechanical cleaning.

Both agencies obtain information on mechanical crushing, and Census, in addition, obtains data for screening and sizing. The Bureau of Mines figures for mechanical crushing show all coal crushed at mines, including that which was both crushed and mechanically cleaned. The Census figures represent coal prepared only by mechanical crushing, screening, and sizing.

The Bureau of Mines commodity statistics include data for State-owned or State-operated mines producing coal, with inmate labor, for use at State institutions. Government institutions, in general, are out of the scope of the Bureau of the Census. In 1958 the Bureau of the Census, for the first time, collected information on coal purchased and resold without further processing. Data for such resales are not collected by the Bureau of Mines.

Natural Gas.—The Bureau of Mines figure that is equivalent to the Bureau of the Census figure for production is "gross withdrawals"; that is, marketed production plus quantities used in repressuring and quantities vented and wasted. The Bureau of Mines figure that is equivalent to the Bureau of the Census figure for shipments is "marketed production," comprising gas sold or consumed by producers, including losses in transmission, amounts added to storage, and increases in gas in pipelines. The Bureau of the Census has shown 562,371 million cubic feet of gas produced and used in the same establishment in lease operations and a net increase in underground storage of 12,368 million cubic feet; these figures are not included for Census shipments.

Peat.—The difference in the values of peat of the two agencies may be because the Bureau of the Census includes the value of containers when the product is sold in containers at the mine or preparation plant.

TABLE 45.—Comparison of the Bureau of Mines and Bureau of the Census mineral fuels production data for 1958

Mineral	Commodity data						Industry data, Bureau of the Census					
	Bureau of Mines			Bureau of the Census			Industry code	Total industry value of shipments and receipts (thousand dollars)	Primary products, net shipments			Secondary products, services, and resales (thousand dollars)
	Measurement stage	Quantity (thousand short tons unless otherwise specified)	Value (thousand dollars)	Measurement stage	Quantity (thousand short tons unless otherwise specified)	Value (thousand dollars)			Total produced in all industries (thousand dollars)	Produced in specified industry (thousand dollars)	Produced in other industries (thousand dollars)	
Mineral fuels:												
Asphalt and related bitumens (native):												
Bituminous limestone and sandstone	Production	1,326	3,343	Production Shipments	1,298 1,298	(1) 3,327	1494	8,041	8,027	8,027	----------	14
Gilsonite	do	317	4,864	Production Shipments	317 321	(1) 4,700						
Carbon dioxide, natural, estimate (thousand cubic feet).	do	722,616	102	----------	(2)	(2)	[3] 2813	(2)	(2)	(2)	(2)	(2)
Coal:												
Bituminous	do	408,019	1,990,575	Production Net shipments	413,580 417,075	(1) 2,062,140	1211	2,390,677	2,055,042	2,054,067	435	26,986
Lignite	do	2,427	5,706	Production Net shipments	4,231 4,231	(1) 11,021	1212	11,035	11,021	11,021	----------	14
Pennsylvania anthracite	do Shipments	21,171 20,976	187,898 186,665	Production Net shipments	22,258 22,341	(1) 196,425	1111	290,342	196,425	196,425	----------	7,749
Crude petroleum (thousand 42-gallon barrels)	Production	2,449,016	7,380,065	Production Shipments	2,319,162 2,317,565	(1) 6,934,158	[3] 1311	7,809,998	7,082,194	6,899,121	183,073	910,777
Field condensate and drips (thousand barrels)	----------	----------	----------	do	48,647	148,036						
	do	352,134	5,741	----------	(2)	(2)	[3] 2813	(2)	(2)	(2)	(2)	(2)
Helium (thousand cubic feet)	Gross withdrawals	13,146,635	(1)	Production	12,152,585	(1)						
Natural gas (million cubic feet)	Marketed production	11,030,298	1,317,492	Shipments	10,134,236	1,294,271	1311	576,008	1,294,271	432,565	861,706	143,443
Natural gas liquids (thousand 42-gallon barrels)	Production Shipments	294,749 292,128	689,710 (1)	Production Shipments	294,192 294,887	(1) 699,328	1321	1,625,098	699,328	699,328	----------	7,587
Peat	Production Shipments	328 (1)	3,446 (1)	Production Shipments	366 365	(1) 4,253	1498	4,379	4,253	(2)	(2)	59

---

[1] Data not available.
[2] Data not available separately.
[3] Mineral or minerals designated in subject column represent one or more of those included in 4-digit industry code specified.

Employment and Injuries in the Fuel Industries

By John C. Machisak

◆

Contents

	Page		Page
Introduction	47	Peat	51
Coal	47	Native Asphalt	51
Coke	49	Conclusion	52
Oil and Gas	50		

INTRODUCTION

THIS CHAPTER of the Minerals Yearbook contains injury experience and related employment information for the coal-mining, coking, oil and gas, peat, and native asphalt industries of the United States for 1961. Injury experience is measured by the number of injuries per million man-hours of exposure in each industry. No attempt has been made to combine these data and present rates reflecting the mineral-fuel industries, as the hazards of the separate industries are not comparable. Tabulations showing the trend of injuries and employment for all mineral industries are presented in volume III of the Minerals Yearbook.

COAL

Disabling work injury rates at all coal mines in 1961 increased 9 percent over 1960, according to final data for anthracite mines and preliminary data for bituminous coal and lignite mines. The frequency rate of all injuries (fatal and nonfatal combined) was 47.29 in 1961 and 43.43 in 1960.

The number of fatal injuries (294) represented a 9-percent decline from the preceding year and was one more than the record low established in 1959. One major disaster (a single accident resulting in the death of five men or more) occurred in 1961. A gas explosion in an Indiana mine on March 2 resulted in the death of 22 men.

The number of nonfatal injuries at all coal mines dropped 6 percent from the preceding year and was the lowest number yet recorded.

Employment continued to decline, with a 17-percent decrease in the average number of production and development workers. Even though active days rose from 189 to 196, man-hours dropped 14 percent.

Bituminous coal mines.—Preliminary data for bituminous coal and lignite mines in 1961 indicated an increase of 10 percent in the combined fatal and nonfatal frequency rate over final data for 1960; however, the number of fatal and nonfatal injuries dropped 5 and 6 percent, respectively.

Of the 275 fatalities reported by the industry, 242 occurred underground, 18 at surface operations, 14 at strip pits, and 1 at an auger mine. Falls of roof, face, or rib continued to be the leading cause of fatal injuries; 135 deaths, or 49 percent of the total fatalities in the industry, resulted from these causes. Deaths from haulage accidents at all locations in the bituminous coal and lignite industry totaled 49 and accounted for 18 percent of the total.

Substantial reductions were noted in the average number of men employed and total man-hours for the industry—employment dropped approximately 28,000, and exposure time declined 36 million hours.

TABLE 1.—Employment and injury experience at coal mines in the United States, 1957–61[1]

Industry and year	Average men working daily[2]	Average active mine days[3]	Man-days worked (thousand)	Man-hours worked (thousand)	Number of injuries		Injury rate per million man-hours
					Fatal	Nonfatal	
Bituminous-coal mines:[4]							
1957	223,900	206	46,020	363,896	427	15,915	44.91
1958	198.350	183	36,260	286,758	326	12,036	43.11
1959	180,303	187	33,738	266,660	246	10.440	40.07
1960	170,628	190	32,417	257,075	290	10,501	41.98
1961[5]	142,300	196	27,814	220,820	275	9,915	46.15
Anthracite mines:							
1957	30,825	196	6,057	44,311	51	2,877	66.08
1958	26,540	183	4,861	35,471	32	2,124	60.78
1959	23.294	173	4,036	29,371	47	1,723	60.26
1960	19,051	176	3,360	24.452	35	1,401	58.73
1961	15,792	196	3,098	22,424	19	1,295	58.60
Total coal mines:							
1957	254,725	204	52,077	408,207	478	18,792	47.21
1958	224,890	183	41,121	322.229	358	14,160	45.05
1959	203,597	186	37.773	296,031	293	12,163	42.08
1960	189.679	189	35,778	281,528	325	11,902	43.43
1961[5]	158,092	196	30,912	243,244	294	11,210	47.29

[1] Man-days and man-hours of employment have been rounded to the nearest thousand and will not necessarily add to the published total.

[2] Average number of men at work each day mine was active. Because absenteeism and labor turnover were considered, this number is lower than number of men available for work, as measured by a count of names on payroll.

[3] Average in which operating time of each mine is weighted by average number of workers in mines.

[4] Includes lignite.

[5] Bituminous data for 1961 are preliminary.

Anthracite mines.—Reductions of 46 and 8 percent, respectively, in the number of fatal and nonfatal injuries at anthracite mines resulted in only an 0.2 percent improvement in the combined frequency rate, due to an 8-percent drop in the total man-hours from 1960.

Of the 19 deaths reported by the industry, 14 occurred underground, 3 at surface operations, and 2 at stripping operations. A great improvement was noted in the number of fatalities from falls of roof, face, or rib; there were 9 such deaths in 1961, compared with 18 in

1960. Haulage accidents, the second ranking cause of fatalities, accounted for 5 deaths, or 26 percent of the total.

The average number of men working dropped 17 percent from the preceding year, but the men worked 20 days more, resulting in an increase of 136 hours per man per year.

COKE

The overall injury-frequency rate of the coking industry in 1961 was 4 percent higher than that of 1960. The number of fatalities was the same, whereas the nonfatal injuries were 30 fewer than those reported for 1960, falling below 200 for the first time on record. Although injuries decreased 13 percent, man-hours dropped 17 percent, resulting in a higher injury-frequency rate. The number of ovens operated decreased 15 percent, and employment decreased 18 percent. Employees averaged 2,830 hours of work; work shifts averaged 8 hours; and the medial operating time of plants increased 4 days.

Slot-type ovens.—The three fatalities and 87 percent of all nonfatal injuries, reported in the coke industry occurred at slot-type ovens. In 1961 the lowest number of injuries was recorded for slot-type ovens since the first complete canvass in 1916. The combined frequency rate of fatal and nonfatal injuries at these ovens indicated an increase of 14 percent over that of 1960. Employment and man-hours of worktime dropped 17 percent each, and employees averaged 1 workday less than in 1960, averaging 2,874 hours of work and producing 1.438 tons of coke per man-hour. There were no work stoppages, and the work shift averaged 8 hours.

TABLE 2.—Employment and injury experience at coke ovens in the United States, 1957–61 [1]

Industry and year	Average men working daily [2]	Average active plant days [3]	Man-days worked (thousand) [4]	Man-hours worked (thousand) [4]	Number of injuries		Injury rate per million man-hours
					Fatal	Nonfatal	
Slot-type coke ovens:							
1957	19,203	364	6,989	55,859	12	197	3.74
1958	15,654	359	5,616	44,970	5	190	4.34
1959	15,865	337	5,354	42,782	3	183	4.35
1960	15,779	360	5,673	45,353	3	177	3.97
1961	13,106	359	4,707	37,661	3	167	4.51
Beehive-coke ovens:							
1957	1,061	186	198	1,478	----------	47	31.80
1958	532	125	67	516	----------	20	38.76
1959	780	145	113	844	----------	39	46.20
1960	684	139	95	712	----------	46	64.57
1961	428	196	84	645	----------	26	40.33
All coke ovens:							
1957	20,264	355	7,187	57,337	12	244	4.46
1958	16,186	351	5,683	45,486	5	210	4.73
1959	16,645	328	5,467	43,626	3	222	5.16
1960	16,463	350	5,768	46,066	3	223	4.91
1961	13,534	354	4,791	38,306	3	193	5.12

[1] All data are final.

[2] Average number of men at work each day oven was active. Because absenteeism and labor turnover are considered, this number is lower than the number of men available for work, as measured by a count of names on payroll.

[3] Average in which operating time of each plant is weighted by average number of workers in the plant.

[4] Man-days and man-hours of employment have been rounded to the nearest thousand and will not necessarily add to published totals.

Beehive-coke ovens.—The ninth consecutive year without a fatality in the beehive segment of the coke industry was recorded, and the nonfatal injuries decreased 43 percent in number and 38 percent in frequency rate. A decline of 37 percent in employment was accompanied by decreases in man-days and man-hours of 12 and 10 percent, respectively. Man-shifts averaged 7.7 hours. Employees worked 57 days more on the average than in 1960, and the median annual man-hours of worktime per employee increased 45 percent over that of 1960.

Employment and man-hours of exposure were lower than in any year since 1946, dropping 11 and 10 percent, respectively. Employees worked an average of 2,102 hours, an increase of 22 hours in worktime (1 percent) in 1961.

OIL AND GAS

A 4-percent decrease in the number of injuries in the oil and gas industry was accompanied by a 10-percent drop in worktime, resulting in a 7-percent increase in the fatal and nonfatal injury occurrence (per million man-hours of exposure). Injuries were also 33 percent more severe than in 1960, due principally to a 35-percent increase in the number of fatalities, each with a time-loss charge of 6,000 days. Permanent partial injuries also increased 36 percent, whereas temporary total injuries decreased 6 percent.

The nonfatal injuries consisted of 420 permanent partial and 8,277 temporary total injuries, with an average time-loss charge of 41 days—the same as for 1960. However, when fatal and permanent total injuries were included with these categories, the time-loss charge rose to 116 days, an increase of 22 days over 1960.

Only four segments of the industry improved their injury experience: Exploration, marine transportation (both ocean and inland waters), and miscellaneous. Severity of injuries was worse in the following six fields: Drilling, natural gasoline, pipeline oil, pipeline gas, refining, and marketing. Improved rates occurred in both frequency and severity in exploration, marine transportation (both), and miscellaneous.

TABLE 3.—Employment and injury experience in the oil and gas industry of the United States, 1957–61

Year	Average men working daily	Man-hours worked (thousand)	Number of injuries		Injury rate per million man-hours
			Fatal [1]	Nonfatal	
1957	617,596	1,293,725	121	11,426	8.93
1958	584,708	1,215,722	116	11,588	9.63
1959	559,244	1,185,146	120	10,543	9.00
1960	511,107	1,063,332	82	9,110	8.64
1961	452,721	951,743	111	8,697	9.25

[1] Fatal and permanent total injuries combined.

PEAT

Injury experience in the peat extracting and processing industry improved greatly. The 17 nonfatal injuries reported by the industry occurred at a rate of 16.38 per million man-hours of exposure, indicating decreases of 29 percent in the number of injuries sustained and 41 percent in the rate of occurrence. Reports were received from 21 States in each year, but the number of companies increased from 115 in 1960 to 125 in 1961.

Of the 17 nonfatal injuries reported, 1 was a permanent partial injury resulting from a machinery accident. The leading cause of the temporary total injuries was handling materials; this agency accounted for 8 (50 percent) of the remaining 16 injuries. Falls of persons was second with 4 injuries, whereas haulage, machinery, handtools, and occupational diseases (dermatitis) resulted in 1 disability each.

A total of 765 employees engaged in the extraction and processing operations accumulated better than a million man-hours of worktime, averaging 1,357 hours during 1961. A rise of 33 percent in employment was noted; however, average hours worked per man dropped 10 percent.

TABLE 4.—Employment and injury experience in the peat industry in the United States, 1957–61

Year	Average men working daily	Man-hours worked (thousand)	Number of injuries		Injury rate per million man-hours
			Fatal	Nonfatal	
1957[1]	139	231		5	21.68
1958	464	704		12	17.05
1959	467	738	1	14	20.33
1960	576	866		24	27.72
1961	765	1,038		17	16.38

[1] Incomplete return—first year of canvass.

NATIVE ASPHALT

The injury experience of the native asphalt industry improved during 1961; the combined frequency rate of injuries dropped 5 percent below that recorded for 1960. The number of active operations decreased by 2, and employment and man-hours were off 14 and 16 percent, respectively.

The leading cause of accidents was handling materials. Of the 31 injuries reported, 9 (29 percent) resulted from this agency; haulage accidents ranked second with 5 injuries (16 percent), including the one fatality reported by the industry. Of the 30 nonfatal injuries, 14 occurred underground, 2 at surface operations, 2 at open-cut mines, 9 at processing plants, and 3 at auxiliary works. The fatal accident occurred underground.

TABLE 5.—Employment and injury experience at bituminous limestone, bituminous sandstone, and gilsonite mines in the United States, 1960–61[1]

Year	Average men working daily	Days active	Man-days worked (thousands)	Man-hours worked (thousands)	Number of injuries		Injury rate per million man-hours
					Fatal	Nonfatal	
1960	445	264	117	948	1	38	41.16
1961	383	256	98	792	1	30	39.17

[1] Prior to 1960, these data were published with the nonmetals industry in Volume I of the Minerals Yearbook.

CONCLUSION

Although the number of injuries reported by each of the fuel industries was fewer than in 1960, the injury-frequency rate increased in all except peat and native asphalt. Nonfatal injuries were the lowest recorded by the Bureau in coal mining, coke, and the oil and gas industries, but they were accompanied by even greater reductions in total worktime.

PART II. COMMODITY REVIEWS

A. *Coal and Related Products*

Coal—Bituminous and Lignite

By W. H. Young,[1] R. L. Anderson,[2] and E. M. Hall[3]

Contents

Page
General summary 53
Scope of report 54
Reserves 56
Thickness of bituminous coal and lignite seams 58
Domestic production 61
Production by months and weeks 64
Summary by States 69
Number and size of mines 72
Employment and productivity 75
Underground mining 77
Strip mining 91
Auger mining 101
Mechanical loading 109
Mechanical cleaning 117
Domestic production—Continued
Mechanical crushing 123
Treatment for allaying dust 125
Thermal drying 128
Production by States and counties 130
Transportation 139
Consumption 143
Relative rate of growth of mineral fuels and waterpower 147
Stocks 147
Prices 148
Lignite 150
Foreign trade 151
World production 154
Coal technology 157

GENERAL SUMMARY

THE BITUMINOUS coal and lignite industry declined slightly in 1961, compared with the 1960 figures. All of the major items, production, consumption, average value, exports, and employment, declined. Even the steady upward trend in mechanization failed to materialize; the percentages of total tonnages mechanically loaded and cleaned remained the same as in the preceding year. However, tonnage per man per day increased from 12.83 tons in 1960 to 13.87 tons in 1961, owing partly to the increased tonnage produced by continuous mining machines. Also, the percentage of total production mined by stripping and by augers increased slightly.

Production.—The output of bituminous coal and lignite in the United States in 1961—403 million tons—was 3 percent less than the 416 million tons produced in 1960. Production was retarded in 1961, owing largely to the business recession and reduced exports.

The major seasonal fluctuation in production, as in the past, resulted from the miners' vacation period of 12 days in midsummer. According to the Bureau of Labor Statistics, U.S. Department of Labor, time lost because of strikes totaled 91,000 man-days in 1961, compared with 137,000 in 1960.

Trend of Employment.—Employment decreased 11 percent.

---

[1] Chief, Section of Bituminous Coal and Lignite, Division of Bituminous Coal.
[2] Mining engineer, Division of Bituminous Coal.
[3] Supervisory statistical assistant, Division of Bituminous Coal.

Index to Capacity.—As it is impossible for all mines to operate every working day in the year, an estimate of 280 days for calculating potential capacity was suggested some years ago by the coal committee of the American Institute of Mining, Metallurgical and Petroleum Engineers. The average output per day worked in 1961 was 2.1 million tons, which, if applied to 280 days, gives an annual potential output of 585 million tons, compared with the actual production of 403 million tons. This figure is not a measure of practical productive capacity of the industry because railroad coal car availabilities and other factors bearing on the ability of the industry to produce are not reflected in this computation.

Mechanization.—Coal output that was loaded mechanically at underground mines in the United States—86 percent—was the same as in 1960.

Mechanical Cleaning.—Approximately 66 percent of the bituminous coal and lignite mined in the United States in 1961 was mechanically cleaned. The growth of mechanical cleaning closely paralleled that of mechanical mining, partly because more refuse was loaded with the coal. Moreover, the bituminous coal and lignite industry has attempted to meet the consumer demand for cleaner coal. A large part of the remaining 34 percent was handpicked and screened into various sizes at tipples where no mechanical cleaning facilities existed.

Consumption.—Consumption of bituminous coal and lignite in the United States decreased 2 percent, principally in bunkers, coke ovens, cement mills, and retail deliveries. However, electric utilities, steel mills, and other manufacturing industries consumed more coal in 1961 than in 1960.

Trends of Fuel Efficiency.—As in many other years, electric-power utilities scored new records in fuel efficiency.

Competition With Oil and Gas.—Although consumption of energy has increased steadily since 1920, the proportion supplied by bituminous coal and lignite has decreased consistently as a result of serious competition from oil and gas. Of total energy consumed in 1960, bituminous coal and lignite furnished 22 percent; anthracite, 1 percent; oil, 43 percent; gas, 30 percent; and waterpower, 4 percent.

Electric utilities consumed 3 percent more bituminous coal, 6 percent more gas, and 0.4 percent more fuel oil in 1961.

Stocks.—The reserve supply of bituminous coal and lignite in the hands of industrial consumers and retail coalyards decreased from 73 million tons at the beginning of the year to 71 million tons at the end of the year. Stocks decreased from a 66- to a 59-day supply. Stocks on the upper lake docks decreased 623,087 tons from January 1 to December 31, 1961.

Exports.—Exports totaled 35 million tons, decreasing 4 percent from 1960; 24 million tons was shipped overseas and 11 million tons, to Canada.

SCOPE OF REPORT

These data include all coal produced in the United States except Pennsylvania anthracite, Texas lignite, and bituminous coal and lignite mines that produced under 1,000 tons per year.

Throughout the chapter all tonnage figures show net tons of marketable coal and exclude washery and other refuse. "Tons" refers to net short tons of 2,000 pounds.

Statistics for 1961 are final and are based upon detailed annual reports of production and mine operation furnished by producers. All but a small percentage of the output was covered by the reports submitted. For production not directly reported (chiefly that of small mines), accurate data were obtained from the records of the various State mine departments (which have statutory authority to require such reports) or in a few instances, from railroad carloadings. Thus, complete coverage of all mines producing 1,000 tons a year or more is reported. Inclusion of many small mines that produce less than 1,000 tons a year was not attempted.

From 1955 to 1961 the annual production form did not request information on employment. These figures for men working daily, days worked, man-days worked, and tons per man per day were obtained from the Accident Analysis Branch of the Bureau of Mines.

Statistical procedures are also detailed in the following sections: Production by Months and Weeks, Number and Size of Mines, Mechanical Cleaning, Production by States and Counties, Consumption, and Stocks.

TABLE 1.—Salient statistics of the bituminous coal and lignite industry in the United States

Item	1960	1961	Change from 1960 (percent)
Production ... net tons	415, 512, 347	402, 976, 802	−3. 0
Consumption ... do	380, 429, 000	374, 405, 000	−1. 6
Stocks at end of year:			
Industrial consumers and retail yards ... do	73, 244, 000	71, 418, 000	−2. 5
Stocks on upper lake docks ... do	3, 654, 317	3, 031, 230	−17. 1
Imports and exports: [1]			
Imports ... do	260, 495	164, 259	−36. 9
Exports ... do	36, 491, 424	34, 969, 825	−4. 2
Price indicators, average per net ton:			
Cost of coking coal at merchant coke ovens	$10. 55	$9. 83	−6. 8
Retail price [2]	$17. 06	$17. 12	+. 4
Railroad freight charge [3]	$3. 40	$3. 40	------------
Value f.o.b. mines	$4. 69	$4. 58	−2. 3
Equipment sold:			
Mobile loading machines	110	84	−23. 6
Continuous mining machines	128	115	−10. 2
Augers	25	18	−28. 0
Shuttle cars	219	214	−2. 3
Conveyors:			
Gathering and haulage	92	111	+20. 7
Room or transfer	47	66	+40. 4
Method of mining:			
Hand loaded underground ... net tons	39, 102, 535	37, 416, 063	−4. 3
Mechanically loaded underground ... do	245, 785, 775	235, 349, 922	−4. 2
Percentage of total underground production mechanically loaded	86. 3	86. 3	------------
Mined by stripping ... net tons	122, 629, 664	121, 979, 084	−. 5
Mined at auger mines ... do	7, 994, 373	8, 231, 733	+3. 0
Mechanically cleaned ... do	273, 168, 694	264, 710, 942	−3. 1
Number of mines	7, 865	7, 648	−2. 8
Average number of days worked [4]	191	193	+1. 0
Average number of men working daily [4]	169, 400	150, 474	−11. 2
Production per man per day [4] ... net tons	12. 83	13. 87	+8. 1
Fuel efficiency indicator: Pounds of coal per kilowatt-hour at electric powerplants [5]	0. 88	0. 86	−2. 3

[1] Bureau of the Census, U.S. Department of Commerce.
[2] Bureau of Labor Statistics, U.S. Department of Labor.
[3] Interstate Commerce Commission.
[4] Accident Analysis Branch, Federal Bureau of Mines.
[5] Federal Power Commission.

RESERVES

TABLE 2.—Coal reserves of the United States, January 1, 1960, by States

(Million short tons)

State	Date of publication of estimate	Estimated original reserves				Total	Reserves depleted to Jan. 1, 1960		Remaining reserves, Jan. 1, 1960	Recoverable reserves, Jan. 1, 1960 assuming 50 percent recovery
		Bituminous coal	Subbituminous coal	Lignite	Anthracite and semianthracite		Production [1]	Production plus loss in mining [2]		
ALABAMA [3]	(4)	[5] 13,754		20		[5] 13,774	[6] 23	[6] 46	13,728	6,864
ALASKA	(7)	21,401	[8] 71,136	(8)	2,101	94,638	13	26	94,612	47,306
ARKANSAS	1960	1,816		350	456	2,622	99	198	2,424	1,212
COLORADO	1959	63,203	18,492		90	81,785	506	1,012	80,773	40,387
GEORGIA	1953	100				100	12	24	76	38
ILLINOIS	1953	137,329				[9] 137,329	[10] 474	[10] 948	136,381	68,190
INDIANA	1953	37,293				37,293	1,148	2,296	34,997	17,499
Iowa [11]	1909	29,160				29,160	357	714	28,446	14,223
KANSAS	B-1951 L-1952	[9] 20,774		(12)		[9] 20,774	[10] 13	[10] 26	20,748	10,374
KENTUCKY	(4)	72,318				72,318	2,646	5,292	67,026	33,513
MARYLAND	1953	[9] 1,200				[9] 1,200	[10] 6	[10] 12	1,188	594
MICHIGAN	1950	297				297	46	92	205	102
Missouri	1913	79,362				79,362	287	574	78,788	39,394
MONTANA	1949	2,363	132,151	87,533		222,047	171	342	221,705	110,853
NEW MEXICO	1950	10,948	50,801		6	61,755	125	250	61,505	30,753
NORTH CAROLINA	1955	112				112	1	2	110	55
NORTH DAKOTA	1953			350,910		350,910	96	192	350,718	175,359
OHIO	1960	46,488				46,488	2,052	4,104	42,384	21,192
OKLAHOMA	1957	3,673		(12)		3,673	180	360	3,313	1,656
OREGON	1955	20	180			200	3	6	194	97

PENNSYLVANIA	B-1928 A-1945	75,093	----------	----------	22,805	97,898	13,508	27,016	70,882	35,441
SOUTH DAKOTA	1952	----------	----------	2,033	----------	2,033	1	2	2,031	1,015
TENNESSEE	1959	[13] 1,912	----------	----------	----------	[13] 1,912	[14] 6	[14] 12	1,900	950
TEXAS [15]	B-1909 L-1955	8,000	----------	7,070	----------	15,070	95	190	14,880	7,440
UTAH	(7)	28,222	156	----------	----------	28,378	260	520	27,858	13,929
VIRGINIA	1952	11,696	----------	----------	355	12,051	782	1,564	10,487	5,244
Washington	1929	11,413	[8] 52,442	(8)	23	63,878	149	298	63,580	31,790
WEST VIRGINIA	1940	116,618	----------	----------	----------	116,618	6,369	12,738	103,880	51,940
WYOMING	1950	13,235	[8] 108,319	(8)	----------	121,554	402	804	120,750	60,375
Other States	----------	[16] 620	[17] 4,065	[18] 50	----------	4,735	7	14	4,721	2,360
Total	----------	808,420	437,742	447,966	25,836	1,719,964	[19] 29,837	59,674	1,660,290	830,145

---

[1] Production, 1800 through 1885, from "The first century and a quarter of American coal industry," by H. N. Eavenson, privately printed, Pittsburgh, 1942; production, 1886 through 1923, from U.S. Geological Survey Mineral Resources, annual volumes; production, 1924, through 1957, from U.S. Bureau of Mines, Minerals' Yearbook, annual volumes, augmented for some States by records of State mine inspectors; production, 1958, from U.S. Bureau of Mines, Mineral Market Summary 2974, Sept. 9, 1959; production, 1959, from U.S. Bureau of Mines weekly coal reports and partly estimated.

[2] Assuming past losses equal past production.

[3] Reserve estimates of States in capital letters supersede earlier estimates of M. R. Campbell.

[4] New estimate from report in preparation or in press.

[5] Remaining reserves, Jan. 1, 1958.

[6] Production 1958 and 1959 only.

[7] New estimate presented for first time in this report.

[8] Small reserves and production of lignite included under subbituminous coal.

[9] Remaining reserves, Jan. 1, 1950.

[10] Production 1950 through 1959.

[11] Reserve estimates of States in lowercase letters were prepared by or under the direction of M. R. Campbell before 1928.

[12] Small reserves of lignite in beds generally less than 30 inches thick.

[13] Remaining reserves, Jan. 1, 1959.

[14] Estimated production 1959 only.

[15] New estimate of lignite reserves; Campbell estimate of bituminous coal reserves.

[16] ARIZONA, CALIFORNIA, Idaho, Nebraska, and Nevada.

[17] ARIZONA, CALIFORNIA, and Idaho.

[18] CALIFORNIA, Idaho, Louisiana, and Nevada.

[19] Less than total recorded production of about 34.8 billion tons. See footnotes 5, 6, 9, 10, 13, and 14.

Source: Averitt, Paul. Coal Reserves of the United States—A Progress Report, January 1, 1960. Geol. Survey Bull. 1136, 1961, pp. 10-11.

THICKNESS OF BITUMINOUS COAL AND LIGNITE SEAMS

The Bureau of Mines compiled and published detailed data on thickness of seams for coal mines in 1960.[4] Because of the importance of seam thickness in mining, these data for 1960 follow. See also figure 1.

TABLE 3.—Number and production of bituminous coal and lignite mines in the United States, 1960, classified by thickness of seams mined

Item	Less than 2 feet	2 to 3 feet	3 to 4 feet	4 to 5 feet	5 to 6 feet	6 to 7 feet	7 to 8 feet	8 feet and over	Total
Number of mines:									
Underground	35	1,811	2,178	990	449	266	132	128	5,989
Strip	140	510	418	222	106	52	22	60	1,530
Auger	3	71	129	94	40	8	--------	1	346
Total	178	2,392	2,725	1,306	595	326	154	189	7,865
Percentage of mines:									
Underground	0.6	30.2	36.4	16.5	7.5	4.5	2.2	2.1	100.0
Strip	9.2	33.3	27.3	14.5	6.9	3.4	1.5	3.9	100.0
Auger	.9	20.4	37.3	27.2	11.6	2.3	--------	.3	100.0
Total	2.3	30.4	34.6	16.6	7.6	4.1	2.0	2.4	100.0
Production (thousand tons):									
Underground	231	20,851	65,322	49,633	53,928	39,833	29,665	25,425	284,888
Strip	5,660	19,503	32,934	30,456	17,692	7,126	3,546	5,713	122,630
Auger	44	939	2,781	2,965	971	235	--------	59	7,994
Total	5,935	41,293	101,037	83,054	72,591	47,194	33,211	31,197	415,512
Percentage of production:									
Underground	0.1	7.3	22.9	17.4	19.0	14.0	10.4	8.9	100.0
Strip	4.6	15.9	26.9	24.8	14.4	5.8	2.9	4.7	100.0
Auger	.5	11.7	35.0	37.1	12.1	2.9	--------	.7	100.0
Total	1.4	9.9	24.3	20.0	17.5	11.4	8.0	7.5	100.0

---

[4] Young, W. H., and R. L. Anderson, Thickness of Bituminous Coal and Lignite Seams Mined in 1960. Bu Mines Inf. Circ. 8118, 1962, 19 pp.

TABLE 4.—Number of mines, production, output per man per day, and average thickness of seams mined, at underground, strip, and auger bituminous coal and lignite mines in the United States, 1960, by States

State	Underground mines				Strip mines				Auger mines				Total, all mines			
	Number of mines	Production (net tons)	Average output per man per day (tons)	Average thickness of seams mined (feet)	Number of mines	Production (net tons)	Average output per man per day (tons)	Average thickness of seams mined (feet)	Number of mines	Production (net tons)	Average output per man per day (tons)	Average thickness of seams mined (feet)	Number of mines	Production (net tons)	Average output per man per day (tons)	Average thickness of seams mined (feet)
Alabama	135	10, 365, 340	7. 80	4. 1	39	2, 558, 414	14. 96	2. 8	3	86, 893	26. 32	2. 7	177	13, 010, 647	8. 66	3. 8
Alaska	2	66, 982	6. 01	30. 9	6	655, 489	15. 43	34. 6	-------	-------	-------	-------	8	722, 471	13. 47	34. 3
Arizona	2	5, 526	2. 02	5. 5	-------	-------	-------	-------	-------	-------	-------	-------	2	5, 526	2. 02	5. 5
Arkansas	10	112, 774	4. 24	2. 6	10	296, 425	13. 38	1. 8	-------	-------	-------	-------	20	409, 199	8. 39	2. 0
Colorado	87	2, 914, 437	8. 06	7. 6	7	692, 849	28. 46	8. 4	-------	-------	-------	-------	94	3, 607, 286	9. 34	7. 8
Georgia	2	4, 215	1. 84	1. 5	-------	-------	-------	-------	-------	-------	-------	-------	2	4, 215	1. 84	1. 5
Illinois	59	23, 306, 901	17. 38	7. 5	69	22, 670, 585	30. 04	5. 0	-------	-------	-------	-------	128	45, 977, 486	21. 94	6. 3
Indiana	34	4, 752, 902	11. 96	5. 8	47	10, 784, 967	29. 50	4. 6	-------	-------	-------	-------	81	15, 537, 869	20. 36	5. 0
Iowa	19	200, 100	4. 51	4. 9	25	867, 924	18. 15	4. 5	-------	-------	-------	-------	44	1, 068, 024	11. 58	4. 6
Kansas	2	3, 584	2. 41	2. 1	11	884, 690	17. 11	1. 5	-------	-------	-------	-------	13	888, 274	16. 70	1. 5
Kentucky	1, 630	44, 468, 474	10. 61	4. 3	129	19, 672, 192	36. 16	4. 9	105	2, 705, 826	30. 30	4. 1	1, 864	66, 846, 492	13. 86	4. 5
Maryland	48	260, 198	4. 37	3. 2	37	487, 636	15. 51	4. 3	-------	-------	-------	-------	85	747, 834	8. 22	3. 9
Missouri	10	88, 273	3. 06	3. 6	23	2, 801, 937	11. 83	2. 2	-------	-------	-------	-------	33	2, 890, 210	10. 88	2. 2
Montana (bit. & lig.)	14	115, 993	6. 17	6. 6	5	197, 430	37. 34	16. 6	-------	-------	-------	-------	19	313, 423	13. 01	12. 9
New Mexico	18	249, 762	6. 32	6. 3	1	45, 000	45. 00	3. 0	-------	-------	-------	-------	19	294, 762	7. 27	5. 8
North Dakota (lignite)	1	2, 403	7. 30	9. 0	31	2, 522, 552	37. 07	11. 0	-------	-------	-------	-------	32	2, 524, 955	36. 93	11. 0
Ohio	149	9, 206, 400	10. 95	4. 9	265	23, 883, 289	23. 59	3. 7	56	867, 083	42. 45	3. 8	470	33, 956, 772	18. 13	4. 0
Oklahoma	11	247, 568	3. 10	3. 4	15	1, 093, 965	16. 34	1. 7	-------	-------	-------	-------	26	1, 341, 533	9. 14	2. 0
Pennsylvania	680	44, 070, 560	9. 04	5. 5	553	20, 875, 533	17. 03	3. 2	49	479, 172	18. 53	3. 6	1, 282	65, 425, 265	10. 68	4. 8
South Dakota (lignite)	-------	-------	-------	-------	1	20, 448	10. 10	4. 5	-------	-------	-------	-------	1	20, 448	10. 10	4. 5
Tennessee	332	3, 938, 626	6. 70	4. 2	71	1, 763, 913	20. 97	2. 9	12	227, 911	25. 93	3. 7	415	5, 930, 450	8. 71	3. 8
Utah	45	4, 954, 693	10. 71	10. 8	-------	-------	-------	-------	-------	-------	-------	-------	45	4, 954, 693	10. 71	10. 8
Virginia	1, 201	25, 819, 830	9. 44	5. 6	35	1, 370, 864	26. 77	4. 1	32	647, 201	33. 04	3. 5	1, 268	27, 837, 895	9. 92	5. 5
Washington	9	211, 968	6. 30	7. 8	1	16, 177	9. 77	2. 9	-------	-------	-------	-------	10	228, 145	6. 46	7. 5
West Virginia	1, 479	109, 209, 989	11. 78	5. 1	140	6, 754, 001	13. 65	4. 9	89	2, 980, 287	34. 30	4. 6	1, 708	118, 944, 277	12. 07	5. 1
Wyoming	10	310, 812	7. 60	7. 5	9	1, 713, 384	39. 20	45. 9	-------	-------	-------	-------	19	2, 024, 196	23. 93	40. 0
Total	5, 989	284, 888, 310	10. 64	5. 4	1, 530	122, 629, 664	22. 93	5. 1	346	7, 994, 373	31. 36	4. 2	7, 865	415, 512, 347	12. 83	5. 3

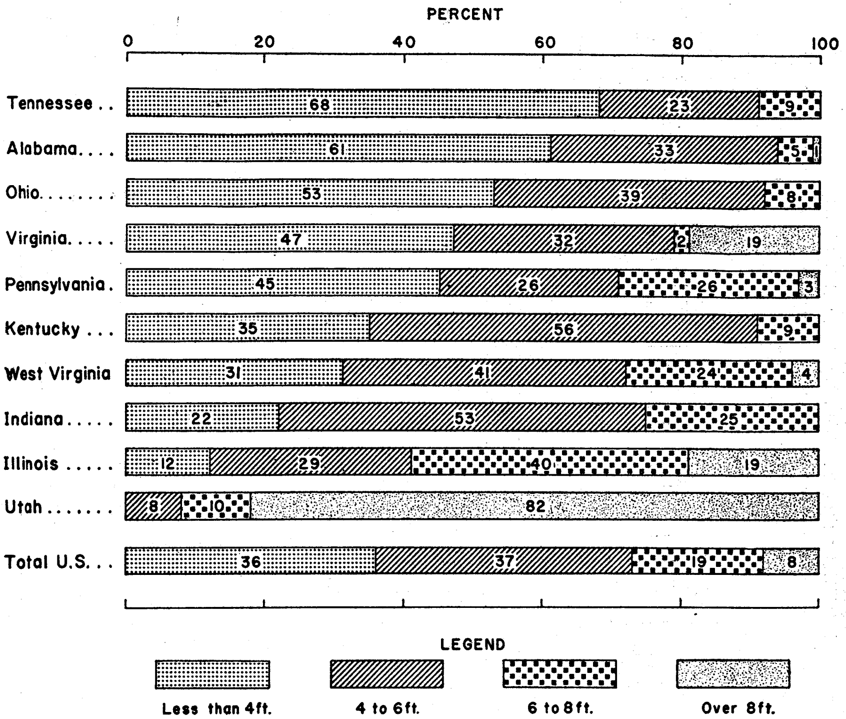

FIGURE 1.—Percentage of bituminous coal and lignite produced in the 10 leading coal-producing States and total United States, 1960, by thickness of seams mined.

DOMESTIC PRODUCTION

TABLE 5.—Growth of the bituminous coal and lignite mining industry in the United States

Year	Production (net tons)	Value of production		Number of mines	Capacity at 280 days (million tons)	Foreign trade [1]	
		Total	Average per ton			Exports (net tons)	Imports (net tons)
1890	111,302,322	$110,420,801	$0.99	(2)	137	1,272,396	1,047,416
1891	117,901,238	117,188,400	.99	(2)	148	1,651,694	1,181,677
1892	126,856,567	125,124.381	.99	(2)	162	1,904,556	1,491,800
1893	128,385,231	122,751,618	.96	(2)	174	1,986,383	1,234,499
1894	118,820,405	107,653,501	.91	(2)	196	2,439,720	1,286,268
1895	135,118,193	115,779,771	.86	2,555	196	2,659,987	1,411,323
1896	137,640,276	114,891,515	.83	2,599	202	2,515,838	1,393,095
1897	147,617,519	119,595,224	.81	2,454	213	2,670,157	1,442,534
1898	166,593,623	132,608,713	.80	2,862	221	3,004,304	1,426,108
1899	193,323,187	167,952,104	.87	3,245	230	3,897,994	1,409,838
1900	212,316,112	220,930,313	1.04	(2	255	6,060,288	1,911,925
1901	225,828,149	236,422,049	1.05	(2)	281	6,455,085	2,214,507
1902	260,216,844	290,858,483	1.12	(2)	316	6,048,777	2,174,393
1903	282,749,348	351,687,933	1.24	(2)	350	5,835,561	4,043,519
1904	278,659,689	305,397,001	1.10	4,650	386	7,206,879	2,179,882
1905	315,062,785	334,658,294	1.06	5,060	417	7,512,723	1,704,810
1906	342,874,867	381,162,115	1.11	4,430	451	8,014,263	2,039,169
1907	394,759,112	451,214,842	1.14	4,550	473	9,869,812	1,892,653
1908	332,573,944	374,135,268	1.12	4,730	482	11,071,152	2,219,243
1909	379,744,257	405,486,777	1.07	5,775	510	10,101,131	1,375,201
1910	417,111,142	469,281,719	1.12	5,818	538	11,663,052	1,819,766
1911	405,907,059	451,375,819	1.11	5,887	538	13,259,791	1,972,555
1912	450,104,982	517,983,445	1.15	5,747	566	16,475,029	1,456,333
1913	478,435,297	565,234,952	1,18	5,776	577	18,013,073	1,767,656
1914	422,703,970	493,309,244	1,17	5,592	608	17,589,562	1,520,962
1915	442,624,426	502,037,688	1.13	5,502	610	18,776,640	1,703,785
1916	502,519,682	665,116,077	1.32	5,726	613	21,254,627	1,713,837
1917	551,790,563	1,249,272,837	2.26	6,939	636	23,839,558	1,448,453
1918	579,385,820	1,491,809,940	2.58	8,319	650	22,350,730	1,457,073
1919	465,860,058	1,160,616,013	2.49	8,994	669	20,113,536	1,011,550
1920	568,666,683	2,129,933,000	3.75	8,921	725	38,517,084	1,244,990
1921	415,921,950	1,199,983,600	2.89	8,038	781	23,131,166	1,257,589
1922	422,268,099	1,274,820,000	3.02	9,299	832	12,413,085	5,059,999
1923	564,564,662	1,514,621,000	2.68	9,331	885	21,453,579	1,882,306
1924	483,686,538	1,062,626,000	2.20	7,586	792	17,100,347	417,266
1925	520,052,741	1,060,402,000	2.04	7,144	748	17,461,560	601,737
1926	573,366,985	1,183,412,000	2.06	7,177	747	35,271,937	485,666
1927	517,763,352	1,029,657,000	1.99	7,011	759	18,011,744	549,843
1928	500,744,970	933,774,000	1.86	6,450	691	16,164,485	546,526
1929	534,988,593	952,781,000	1.78	6,057	679	17.429,298	495,219
1930	467,526,299	795,483,000	1.70	5,891	700	15,877,407	240,886
1931	382,089,396	588,895,000	1.54	5,642	669	12,126,299	206,303
1932	309,709,872	406,677,000	1.31	5,427	594	8,814,047	186,909
1933	333,630,533	445,788,000	1.34	5,555	559	9,036,947	197,429
1934	359,368,022	628,383,000	1.75	6,258	565	10,868,552	179,661
1935	372,373,122	658,063,000	1.77	6,315	582	9,742,430	201,871
1936	439,087,903	770,955,000	1.76	6,875	618	10,654,959	271,798
1937	445,531,449	864,042,000	1.94	6,548	646	13,144,678	257,996
1938	348,544,764	678,653,000	1.95	5,777	602	10,490,269	241,305
1939	394,855,325	728,348,366	1.84	5,820	621	11,590,478	355,115
1940	460,771,500	879,327,227	1.91	6,324	639	16,465,928	371,571
1941	514,149,245	1,125,362,836	2.19	6,822	666	20,740,471	390,049
1942	582,692,937	1,373,990,608	2.36	6,972	663	22,943,305	498,103
1943	590,177,069	1,584,644,477	2.69	6,620	626	25,836,208	757,634
1944	619,576,240	1,810,900,542	2.92	6,928	624	26,032,348	633,689
1945	577,617,327	1,768,204,320	3.06	7,033	620	27,956,192	467,473
1946	533,922,068	1,835,539,476	3.44	7,333	699	41,197,378	434,680
1947	630,623,722	2,622,634,946	4.16	8,700	755	68,666,963	290,141
1948	599,518,229	2,993,267,021	4.99	9,079	774	45,930,133	291,337
1949	437,868,036	2,136,870,571	4.88	8,559	781	27,842,056	314,980
1950	516,311,053	2,500,373,779	4.84	9,429	790	25,468,403	346,706
1951	533,664,732	2,626,030,137	4.92	8,009	736	56,721,547	292,378
1952	466,840,782	2,289,180,401	4.90	7,275	703	47,643,150	262,268
1953	457,290,449	2,247,943,799	4.92	6,671	670	33,760,263	226,900
1954	391,706,300	1,769,619,723	4.52	6,130	603	31,040,465	198,799
1955	464,633,408	2,092,382,737	4.50	7,856	620	51,277,256	337,145
1956	500,874,077	2,412,004,151	4.82	8,520	655	68,522,629	355,701
1957	492,730,916	2,504,406,042	5.08	8,539	680	76,445,529	366,506
1958	410,445,547	1,996,281,274	4.86	8,264	625	50,293,382	306,940
1959	412,027,502	1,965,606,901	4.77	7,719	614	37,226,766	374,713
1960	415,512,347	1,950,425,049	4.69	7,865	609	36,491,424	260,495
1961	402,976,802	1,844,562,662	4.58	7,648	585	34,969,825	164,259

[1] Figures for 1890–1914 represent fiscal year ended June 30. [2] Data not available.

TABLE 5.—Growth of the bituminous coal and lignite mining industry in the United States—Continued

Year	Men employed	Average number of days worked	Average days lost per man on strike	Net tons per man—		Percentage of underground production—		Percentage of total production—	
				Per day	Per year	Cut by machines[1]	Mechanically loaded	Mechanically cleaned[2]	Mined by stripping
1890	192,204	226	(3)	2.56	579	(3)	(3)	(3)	(3)
1891	205,803	223	(3)	2.57	573	5.3	(3)	(3)	(3)
1892	212,893	219	(3)	2.72	596	(3)	(3)	(3)	(3)
1893	230,365	204	(3)	2.73	557	(3)	(3)	(3)	(3)
1894	244,603	171	(3)	2.84	486	(3)	(3)	(3)	(3)
1895	239,962	194	(3)	2.90	563	(3)	(3)	(3)	(3)
1896	244,171	192	(3)	2.94	564	11.9	(3)	(3)	(3)
1897	247,817	196	(3)	3.04	596	15.3	(3)	(3)	(3)
1898	255,717	211	(3)	3.09	651	19.5	(3)	(3)	(3)
1899	271,027	234	46	3.05	713	22.7	(3)	(3)	(3)
1900	304,375	234	43	2.98	697	24.9	(3)	(3)	(3)
1901	340,235	225	35	2.94	664	25.6	(3)	(3)	(3)
1902	370,056	230	44	3.06	703	26.8	(3)	(3)	(3)
1903	415,777	225	28	3.02	680	27.6	(3)	(3)	(3)
1904	437,832	202	44	3.15	637	28.2	(3)	(3)	(3)
1905	460,629	211	23	3.24	684	32.8	(3)	(3)	(3)
1906	478,425	213	63	3.36	717	34.7	(3)	2.7	(3)
1907	513,258	234	14	3.29	769	35.1	(3)	2.9	(3)
1908	516,264	193	38	3.34	644	37.0	(3)	3.6	(3)
1909	543,152	209	29	3.34	699	37.5	(3)	3.8	(3)
1910	555,533	217	89	3.46	751	41.7	(3)	3.8	(3)
1911	549,775	211	27	3.50	738	43.9	(3)	(3)	(3)
1912	548,632	223	35	3.68	820	46.8	(3)	3.9	(3)
1913	571,882	232	36	3.61	837	50.7	(3)	4.6	(3)
1914	583,506	195	80	3.71	724	51.8	(3)	4.8	0.3
1915	557,456	203	61	3.91	794	55.3	(3)	4.7	.6
1916	561,102	230	26	3.90	896	56.9	(3)	4.6	.8
1917	603,143	243	17	3.77	915	56.1	(3)	4.6	1.0
1918	615,305	249	7	3.78	942	56.7	(3)	3.8	1.4
1919	621,998	195	37	3.84	749	60.0	(3)	3.6	1.2
1920	639,547	220	22	4.00	881	60.7	(3)	3.3	1.5
1921	663,754	149	23	4.20	627	66.4	(3)	3.4	1.2
1922	687,958	142	117	4.28	609	64.8	(3)	(3)	2.4
1923	704,793	179	20	4.47	801	68.3	0.3	3.8	2.1
1924	619,604	171	73	4.56	781	71.5	.7	(3)	2.8
1925	588,493	195	30	4.52	884	72.9	1.2	(3)	3.2
1926	593,647	215	24	4.50	966	73.8	1.9	(3)	3.0
1927	593,918	191	153	4.55	872	74.9	3.3	5.3	3.6
1928	522,150	203	83	4.73	959	76.9	4.5	5.7	4.0
1929	502,993	219	11	4.85	1,064	78.4	7.4	6.9	3.8
1930	493,202	187	43	5.06	948	81.0	10.5	8.3	4.3
1931	450,213	160	35	5.30	849	83.2	13.1	9.5	5.0
1932	406,380	146	120	5.22	762	84.1	12.3	9.8	6.3
1933	418,703	167	30	4.78	797	84.7	12.0	10.4	5.5
1934	458,011	178	15	4.40	785	84.1	12.2	11.1	5.8
1935	462,403	179	[4] 7	4.50	805	84.2	13.5	12.2	6.4
1936	477,204	199	21	4.62	920	84.8	16.3	13.9	6.4
1937	491,864	193	[4] 19	4.69	906	(3)	20.2	14.6	7.1
1938	441,333	162	13	4.89	790	87.5	26.7	18.2	8.7
1939	421,788	178	36	5.25	936	87.9	31.0	20.1	9.6
1940	439,075	202	8	5.19	1,049	88.4	35.4	22.2	9.2
1941	456,981	216	27	5.20	1,125	89.0	40.7	22.9	10.7
1942	461,991	246	7	5.12	1,261	89.7	45.2	24.4	11.5
1943	416,007	264	[4] 15	5.38	1,419	90.3	48.9	24.7	13.5
1944	393,347	278	[4] 5	5.67	1,575	90.5	52.9	25.6	16.3
1945	383,100	261	[4] 9	5.78	1,508	90.8	56.1	25.6	19.0
1946	[5] 396,434	214	[4] 23	6.30	1,347	90.8	58.4	26.0	21.1
1947	[5] 419,182	234	[4] 5	6.42	1,504	90.0	60.7	27.7	22.1
1948	[5] 441,631	217	[4] 16	6.26	1,358	90.7	64.3	30.2	23.3
1949	[5] 433,698	157	[4] 15	6.43	1,010	91.4	67.0	35.1	24.2
1950	[5] 415,582	183	[4] 56	6.77	1,239	91.8	69.4	38.5	23.9
1951	[5] 372,897	203	[4] 4	7.04	1,429	93.4	73.1	45.0	22.0
1952	[5] 335,217	186	[4] 6	7.47	1,389	92.8	75.6	48.7	23.3
1953	[5] 293,106	191	[4] 3	8.17	1,560	92.3	79.6	52.9	23.1
1954	[5] 227,397	182	[4] 4	9.47	1,724	88.8	84.0	59.4	25.1
1955	[5] 225,093	210	[4] 4	9.84	2,064	88.1	84.6	58.7	24.8
1956	[5] 228,163	214	[4] 4	10.28	2,195	84.6	84.0	58.4	25.4
1957	[5] 228,635	203	[4] 3	10.59	2,155	80.9	84.8	61.7	25.2
1958	[5] 197,402	184	[4] 3	11.33	2,079	75.3	84.9	63.1	28.3
1959	[5] 179,636	188	[4] 24	12.22	2,294	72.1	86.0	65.5	29.4
1960	[5] 169,400	191	[4] 4	12.83	2,453	67.8	86.3	65.7	29.5
1961	[5] 150,474	193	[4] 4	13.87	2,678	64.7	86.3	65.7	30.3

[1] Percentages for 1890–1913 are of total production, as a separation of underground and strip production is not available for these years.

[2] Percentages for 1906–26 are exclusive of coal cleaned at central washeries operated by consumers.

[3] Data not available. [4] Bureau of Labor Statistics, U.S. Department of Labor.

[5] Average number of men working daily.

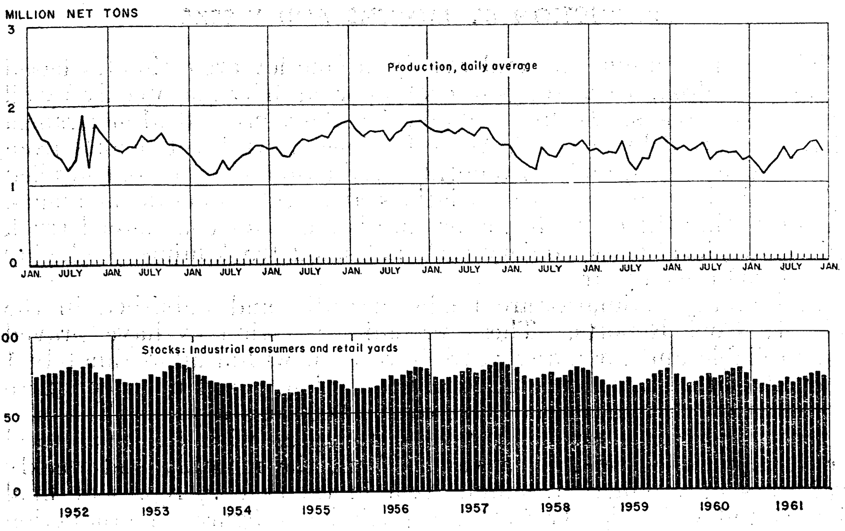

FIGURE 2.—Trends of production and stocks of bituminous coal and lignite in the United States, 1952–61.

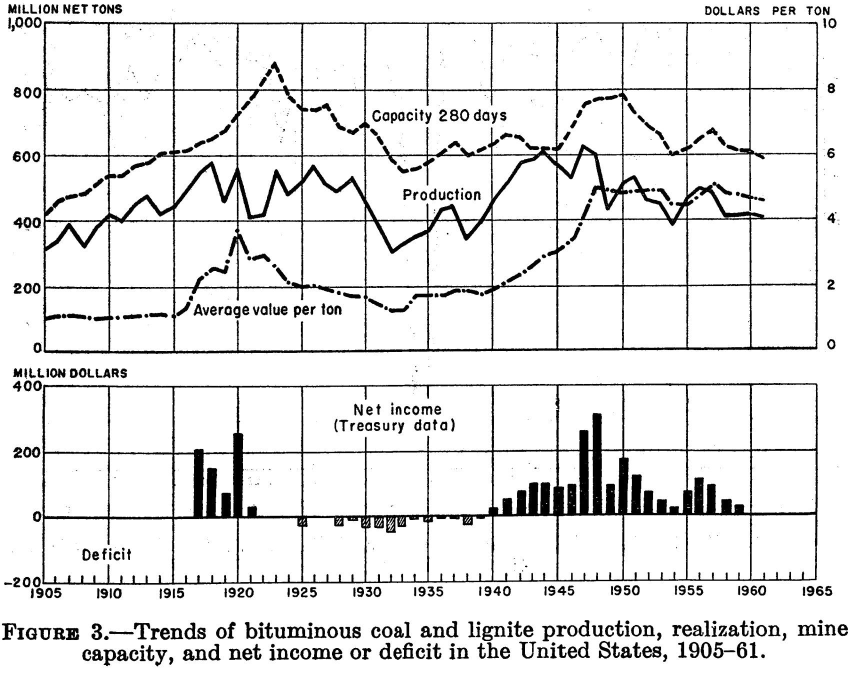

FIGURE 3.—Trends of bituminous coal and lignite production, realization, mine capacity, and net income or deficit in the United States, 1905–61.

PRODUCTION BY MONTHS AND WEEKS

The figures on monthly and weekly production are estimates based upon (1) railroad carloadings of coal reported daily and weekly by all important carriers, (2) shipments on the Allegheny and Monongahela Rivers reported by the U.S. Army Engineers, (3) direct reports from mining companies, and (4) monthly production statements compiled by certain local operators associations and State mine departments. In computing the estimates, allowance is made for commercial truck shipments, local sales, colliery fuel, and small truck mines producing over 1,000 tons a year.

Preliminary estimates are made currently and published in the Weekly Coal Reports. These preliminary estimates have proved very reliable and for many years have been within approximately 1 percent of the final figure of total production, based upon complete coverage of all mines producing over 1,000 tons a year. The preliminary estimates are later revised to agree with the final total production based on the canvass. Thus, the monthly and weekly estimates of production, summarized in tables 6–9, represent final figures and vary slightly from the preliminary figures of production published in the Weekly Coal Reports. See also figures 2, 4, and 5.

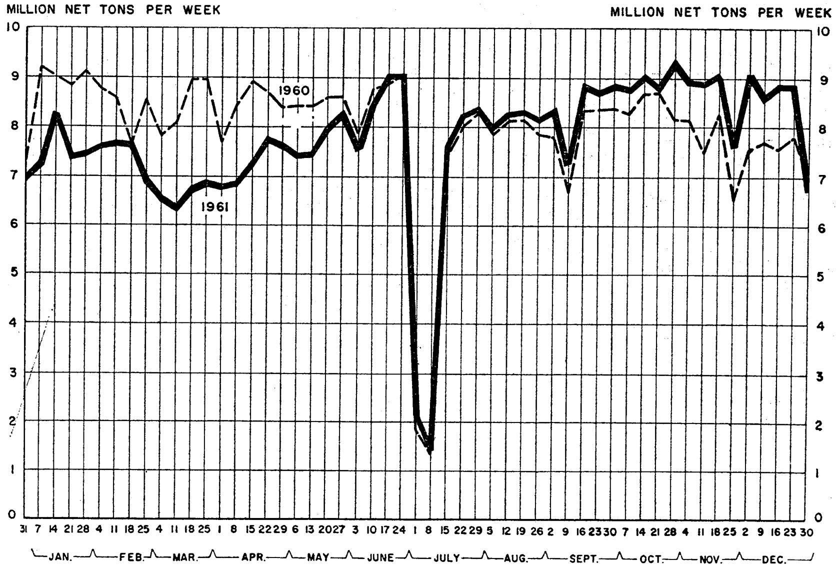

FIGURE 4.—Production of bituminous coal and lignite in the United States, 1960–61, by weeks.

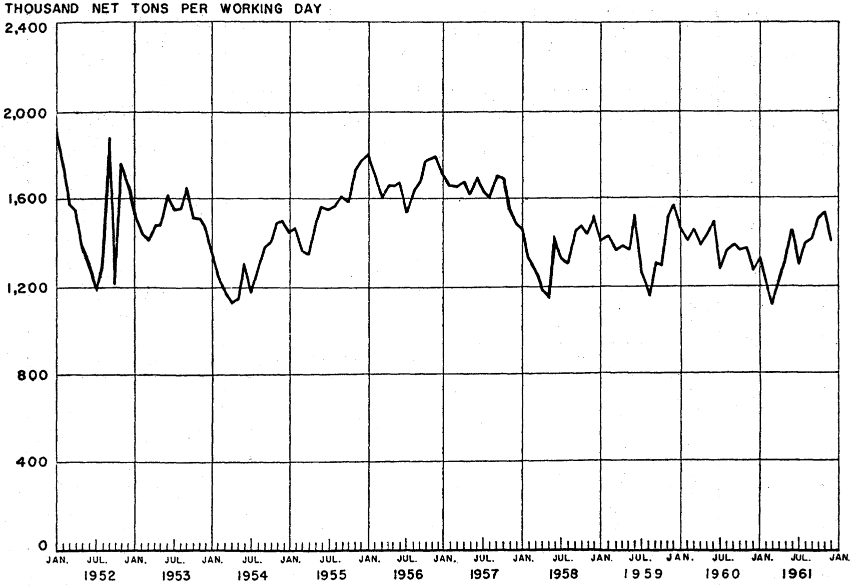

FIGURE 5.—Average production of bituminous coal and lignite in the United States per working day in each month, 1952–61.

TABLE 6.—Production of bituminous coal and lignite in the United States, with estimates by months

Month	Production (thousand net tons)		Maximum number of working days		Average production per working day (thousand net tons)	
	1960	1961	1960	1961	1960	1961
January	36. 648	33, 250	25	25	1. 466	1, 330
February	35. 180	29, 563	25	24	1 407	1, 232
March	39, 306	30, 496	27	27. 4	1, 456	1. 113
April	35, 156	29, 721	25. 4	24. 3	1, 384	1, 223
May	36, 455	35, 102	25. 5	26. 6	1, 430	1, 320
June	33, 788	32, 105	22. 6	22	1, 495	1, 459
July	25. 419	27, 075	19. 9	20. 8	1, 277	1. 302
August	36. 681	37, 847	27	27	1. 359	1, 402
September	34, 700	35, 409	25	25	1, 388	1. 416
October	35, 499	39, 287	26	26	1, 365	1, 511
November	33, 589	38, 078	24. 5	24. 8	1, 371	1, 535
December	33, 091	35, 044	26	25	1. 273	1, 402
Total	415, 512	402, 977	298. 9	297. 9	1, 390	1, 353

TABLE 7.—Production of bituminous coal and lignite in the United States, 1961, by States, with estimates by months

(Thousand net tons)

[Totals for year are based on final complete returns from producers. Monthly apportionment is based on current records of railroad carloadings and shipments on the Allegheny and Monongahela Rivers, supplemented by direct reports from local sources]

State	January	February	March	April	May	June	July	August	September	October	November	December	Total
Alabama	1,185	932	1,180	1,001	1,142	895	818	1,161	1,022	1,236	1,179	1,164	12,915
Alaska	70	62	76	51	48	37	40	54	56	85	79	79	737
Arkansas	44	39	36	34	30	28	29	30	28	29	35	33	395
Colorado	341	270	294	264	281	222	173	271	321	382	400	459	3,678
Georgia	1	1	-----	-----	-----	-----	-----	-----	-----	-----	1	1	4
Illinois	3,986	3,280	3,718	3,524	3,707	3,530	2,819	4,003	3,970	4,367	4,192	4,150	45,246
Indiana	1,518	1,375	1,284	1,133	1,155	1,083	830	1,223	1,201	1,336	1,404	1,564	15,106
Iowa	110	70	74	43	43	61	59	68	60	97	109	133	927
Kansas	62	50	28	31	58	61	47	74	61	69	55	68	664
Kentucky:													
Eastern	2,646	2,383	2,073	2,255	2,809	2,541	2,227	3,160	3,025	3,420	3,210	2,671	32,420
Western	2,749	2,292	2,264	2,334	2,787	2,421	2,172	2,855	2,624	2,903	2,713	2,498	30,612
Total Kentucky	5,395	4,675	4,337	4,589	5,596	4,962	4,399	6,015	5,649	6,323	5,923	5,169	63,032
Maryland	76	55	71	51	62	56	49	66	62	69	76	64	757
Missouri	320	296	226	163	185	206	166	278	259	286	273	280	2,938
Montana:													
Bituminous	9	7	10	7	9	3	7	9	7	9	10	10	97
Lignite	26	19	27	19	24	9	19	24	22	27	29	29	274
Total Montana	35	26	37	26	33	12	26	33	29	36	39	39	371
New Mexico	27	24	26	28	37	30	30	47	43	48	33	39	412
North Dakota (lignite)	299	238	228	157	154	158	133	157	213	292	338	359	2,726
Ohio	2,037	1,791	2,152	2,654	3,389	3,365	2,478	3,242	2,924	3,198	2,822	2,174	32,226
Oklahoma	92	86	97	89	105	88	75	104	72	68	78	77	1,031
Pennsylvania	5,046	4,767	4,984	4,545	5,227	4,889	4,206	5,636	5,322	5,969	6,213	5,848	62,652
South Dakota (lignite)	2	2	2	2	2	1	-----	-----	1	2	2	2	18
Tennessee	459	420	456	436	485	392	415	582	537	633	560	485	5,860
Utah	490	361	400	351	391	337	274	474	503	539	536	503	5,159
Virginia	2,507	2,246	2,294	2,347	2,698	2,444	2,189	2,919	2,570	2,934	2,762	2,422	30,332
Washington	17	14	18	13	13	10	7	13	17	20	24	25	191
West Virginia	8,822	8,302	8,298	8,061	10,093	9,121	7,713	11,268	10,275	10,944	10,617	9,557	113,071
Wyoming	309	181	180	128	168	117	100	129	214	325	328	350	2,529
Total	33,250	29,563	30,496	29,721	35,102	32,105	27,075	37,847	35,409	39,287	38,078	35,044	402,977

TABLE 8.—Production of bituminous coal and lignite in the United States, 1961, by districts, with estimates by months

(Thousand net tons)

[Totals for year are based on final complete returns from producers. Monthly apportionment is based on current records of railroad carloadings and shipments on the Allegheny and Monongahela Rivers, supplemented by direct reports from local sources]

District	January	February	March	April	May	June	July	August	September	October	November	December	Total
1. Eastern Pennsylvania	2,372	2,224	2,337	2,117	2,440	2,280	1,962	2,631	2,482	2,784	2,900	2,721	29,250
2. Western Pennsylvania	2,775	2,622	2,742	2,500	2,875	2,689	2,314	3,100	2,928	3,283	3,417	3,216	34,461
3. Northern West Virginia	2,935	2,864	2,815	2,519	3,011	2,871	2,461	3,390	3,118	3,372	3,293	2,944	35,593
4. Ohio	2,037	1,791	2,152	2,654	3,389	3,365	2,478	3,242	2,924	3,198	2,822	2,174	32,226
5. Michigan	---	---	---	---	---	---	---	---	---	---	---	---	---
6. Panhandle	342	338	334	327	362	353	312	379	358	378	371	347	4,201
7. Southern Numbered 1	2,432	2,182	2,252	2,269	2,917	2,571	2,172	3,250	2,951	3,122	3,001	2,717	31,839
8. Southern Numbered 2	8,577	7,831	7,574	7,847	9,640	8,574	7,467	10,726	9,811	10,861	10,304	8,972	103,184
9. West Kentucky	2,749	2,292	2,264	2,334	2,787	2,421	2,172	2,855	2,624	2,903	2,713	2,498	30,612
10. Illinois	3,986	3,280	3,718	3,524	3,707	3,530	2,819	4,003	3,970	4,367	4,192	4,150	45,246
11. Indiana	1,518	1,375	1,284	1,133	1,155	1,033	830	1,223	1,201	1,336	1,404	1,564	15,106
12. Iowa	110	70	74	43	43	61	59	68	60	97	109	133	927
13. Southeastern	1,309	1,045	1,302	1,117	1,271	1,000	929	1,316	1,165	1,405	1,329	1,295	14,483
14. Arkansas-Oklahoma	93	85	88	82	87	75	69	86	67	66	77	74	949
15. Southwestern	425	386	299	235	291	308	248	400	353	386	364	384	4,079
16. Northern Colorado	92	66	66	54	51	39	21	40	56	89	109	115	798
17. Southern Colorado	273	225	251	235	263	210	179	273	303	336	320	379	3,247
18. New Mexico	3	3	3	3	4	3	3	5	5	5	4	4	45
19. Wyoming	309	181	180	128	168	117	100	129	214	325	328	350	2,529
20. Utah	490	361	400	351	391	337	274	474	503	539	536	503	5,159
21. North-South Dakota	301	240	230	159	156	159	133	157	214	294	340	361	2,744
22. Montana	35	26	37	26	33	12	26	33	29	36	39	39	371
23. Washington	87	76	94	64	61	47	47	67	73	105	103	101	928
Total	33,250	29,563	30,496	29,721	35,102	32,105	27,075	37,847	35,409	39,287	38,078	35,944	402,977

TABLE 9.—Production of bituminous coal and lignite in the United States, with estimates by weeks

1960				1961			
Week ended—	Production (thousand net tons)	Maximum number of working days	Average production per working day (thousand net tons)	Week ended—	Production (thousand net tons)	Maximum number of working days	Average production per working day (thousand net tons)
Jan. 2	[1] 485	[1] 1	[2] 1,465				
Jan. 9	9,211	6	1,535	Jan. 7	7,251	5	1,450
Jan. 16	9,007	6	1,501	Jan. 14	8,286	6	1,381
Jan. 23	8,837	6	1,473	Jan. 21	7,390	6	1,232
Jan. 30	9,108	6	1,518	Jan. 28	7,455	6	1,243
Feb. 6	8,781	6	1,464	Feb. 4	7,622	6	1,270
Feb. 13	8,603	6	1,434	Feb. 11	7,673	6	1,279
Feb. 20	7,678	6	1,280	Feb. 18	7,652	6	1,275
Feb. 27	8,542	6	1,424	Feb. 25	6,908	6	1,151
Mar. 5	7,839	6	1,307	Mar. 4	6,544	6	1,091
Mar. 12	8,090	6	1,348	Mar. 11	6,342	6	1,057
Mar. 19	8,962	6	1,494	Mar. 18	6,721	6	1,120
Mar. 26	8,961	6	1,494	Mar. 25	6,849	6	1,142
Apr. 2	7,706	5.4	1,427	Apr. 1	6,779	5.7	1,189
Apr. 9	8,424	6	1,404	Apr. 8	6,853	6	1,142
Apr. 16	8,929	6	1,488	Apr. 15	7,298	6	1,216
Apr. 23	8,716	6	1,453	Apr. 22	7,769	6	1,295
Apr. 30	8,411	6	1,402	Apr. 29	7,638	6	1,273
May 7	8,439	6	1,407	May 6	7,437	6	1,240
May 14	8,429	6	1,405	May 13	7,469	6	1,245
May 21	8,601	6	1,434	May 20	7,938	6	1,323
May 28	8,617	6	1,436	May 27	8,255	6	1,376
June 4	7,890	5.5	1,435	June 3	7,551	5.6	1,348
June 11	8,787	6	1,465	June 10	8,432	6	1,405
June 18	8,883	6	1,481	June 17	9,032	6	1,505
June 25	9,070	5.8	1,564	June 24	9,024	5.9	1,529
July 2	1,851	1	1,851	July 1	2,120	1.2	1,767
July 9	1,343	1.7	790	July 8	1,439	1.7	846
July 16	7,430	6	1,238	July 15	7,596	6	1,266
July 23	8,012	6	1,335	July 22	8,228	6	1,371
July 30	8,310	6	1,385	July 29	8,375	6	1,396
Aug. 6	7,889	6	1,315	Aug. 5	7,995	6	1,333
Aug. 13	8,126	6	1,354	Aug. 12	8,269	6	1,378
Aug. 20	8,156	6	1,359	Aug. 19	8,303	6	1,384
Aug. 27	7,891	6	1,315	Aug. 26	8,148	6	1,358
Sept. 3	7,832	6	1,305	Sept. 2	8,336	6	1,389
Sept. 10	6,704	5	1,341	Sept. 9	7,239	5	1,448
Sept. 17	8,328	6	1,388	Sept. 16	8,816	6	1,469
Sept. 24	8,346	6	1,391	Sept. 23	8,709	6	1,452
Oct. 1	8,378	6	1,396	Sept. 30	8,827	6	1,471
Oct. 8	8,279	6	1,380	Oct. 7	8,763	6	1,461
Oct. 15	8,692	6	1,449	Oct. 14	9,028	6	1,505
Oct. 22	8,705	6	1,451	Oct. 21	8,789	6	1,465
Oct. 29	8,154	6	1,359	Oct. 28	9,303	6	1,551
Nov. 5	8,126	6	1,354	Nov. 4	8,892	6	1,482
Nov. 12	7,513	5.5	1,366	Nov. 11	8,875	5.8	1,530
Nov. 19	8,257	6	1,376	Nov. 18	9,073	6	1,512
Nov. 26	6,559	5	1,312	Nov. 25	7,622	5	1,524
Dec. 3	7,542	6	1,257	Dec. 2	9,056	6	1,509
Dec. 10	7,731	6	1,289	Dec. 9	8,614	6	1,436
Dec. 17	7,591	6	1,265	Dec. 16	8,838	6	1,473
Dec. 24	7,808	6	1,301	Dec. 23	8,826	6	1,471
Dec. 31	6,953	5	1,391	Dec. 30	6,730	5	1,346
Total	415,512	298.9	1,390	Total	402,977	297.9	1,353

[1] Figures represent output and number of working days in that part of week included in calendar year shown. Total production for the week ended Jan. 2, 1960, was 7,325,000 net tons.

[2] Average daily output for entire week and not for working days in the calendar year shown.

SUMMARY BY STATES

TABLE 10.—Bituminous coal and lignite produced in the United States, by States, with production of maximum year and cumulative production from earliest record to end of 1961

[Thousand net tons]

State	Maximum production		Production, by years										Total production from earliest record to end of 1961
	Year	Quantity	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	
Alabama	1926	21, 001	11, 383	12, 532	10, 282	13, 088	12, 663	13, 260	11, 182	11, 947	13, 011	12, 915	972, 560
Arkansas	1907	2, 670	873	775	477	578	590	508	364	441	409	395	99, 062
Colorado	1917	12, 483	3, 623	3, 575	2, 900	3, 568	3, 502	3, 594	2, 974	3, 294	3, 607	3, 678	513, 798
Illinois	1918	89, 291	45, 790	46, 010	41, 971	45, 932	48, 102	46, 993	43, 912	45, 466	45, 977	45, 246	3, 697, 173
Indiana	1918	30, 679	16, 350	15, 812	13, 400	16, 149	17, 089	15, 841	15, 022	14, 804	15, 538	15, 106	1, 179, 807
Iowa	1917	8, 966	1, 381	1, 388	1, 197	1, 258	1, 358	1, 312	1, 179	1, 180	1, 068	927	353, 502
Kansas	1918	7, 562	2, 029	1, 715	1, 372	742	884	749	823	772	888	664	280, 775
Kentucky	1947	84, 241	66, 114	65, 060	56, 964	69, 020	74, 555	74, 667	66, 312	62, 810	66, 847	63, 032	2, 774, 622
Maryland	1907	5, 533	588	530	422	512	669	748	838	842	748	757	267, 716
Missouri	1917	5, 671	2, 955	2, 393	2, 514	3, 232	3, 283	2, 976	2, 592	2, 748	2, 890	2, 938	292, 221
Montana	1944	4, 844	2, 070	1, 873	1, 491	1, 247	846	413	305	345	313	371	171, 402
New Mexico	1918	4, 023	760	514	123	201	158	137	117	148	295	412	125, 815
North Dakota	1950	3, 261	2, 984	2, 803	(1)	3, 102	2, 815	2, 561	2, 314	2, 413	2, 525	2, 726	[2] 98, 368
Ohio	1920	45, 878	36, 209	34, 737	32, 469	37, 870	38, 934	36, 862	32, 028	35, 112	33, 957	32, 226	2, 123, 796
Oklahoma	1920	4, 849	2, 193	2, 168	1, 915	2, 164	2, 007	2, 195	1, 630	1, 525	1, 342	1, 031	181, 847
Pennsylvania	1918	178, 551	89, 181	93, 331	72, 010	85, 713	90. 287	85, 365	67, 771	65, 347	65, 425	62, 652	8, 356, 907
Tennessee	1956	8, 848	5, 265	5, 467	6, 429	7, 053	8, 848	7, 955	6, 785	5, 913	5, 931	5, 860	400, 289
Utah	1947	7, 429	6, 140	6, 544	5, 008	6, 296	6, 522	6, 858	5, 328	4, 545	4, 955	5, 159	268, 027
Virginia	1961	30, 332	21, 579	19, 119	16, 387	23, 508	28, 063	29, 506	26, 826	29, 769	27, 838	30, 332	846, 117
Washington	1918	4, 082	844	690	619	610	473	360	252	242	228	191	148, 689
West Virginia	1947	176, 157	141, 713	134, 105	114, 996	139, 168	155, 891	156, 842	119, 468	119, 692	118, 944	113, 071	6, 584, 059
Wyoming	1945	9, 847	6, 088	5, 245	2, 831	2, 927	2, 553	2, 117	1, 629	1, 977	2, 024	2, 529	406, 159
Other States [3]	--------	----------	729	904	4, 929	695	782	885	795	696	752	759	186, 281
Total	1947	630, 624	466, 841	457, 290	391, 706	464, 633	500, 874	492, 704	410, 446	412, 028	415, 512	402, 977	30, 328, 992

[1] North Dakota included in "Other States" in 1954 to avoid disclosing individual operations.

[2] Excludes production of North Dakota in 1954 to avoid disclosing individual operations.

[3] Production, if any, in Alaska, Arizona, California, Georgia, Idaho, Michigan, North Carolina, Oregon, South Dakota, or Texas included in "Other States."

TABLE 11.—Number of mines, production, value, men working daily, days active, man-days, and output per man per day at bituminous coal and lignite mines in the United States, 1961, by States

State	Number of active mines	Production (net tons)				Average value per ton [3]	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day
		Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total					
Alabama	193	10,677,074	1,232,508	1,005,883	12,915,465	$7.04	6,551	199	1,301,188	9.93
Alaska	5	721,519	6,299	9,013	736,831	7.96	184	288	53,028	13.90
Arkansas	21	381,053	13,875	8	394,936	7.31	327	160	52,416	7.53
Colorado	91	2,562,496	997,399	118,051	3,677,946	6.20	1,765	193	339,799	10.82
Georgia	2	-----------	4,426	-----------	4,426	5.00	8	206	1,651	2.68
Illinois	114	40,515,264	4,599,311	130,988	45,245,563	3.91	8,855	215	1,906,634	23.73
Indiana	72	12,968,349	1,477,449	660,377	15,106,175	3.89	3,220	216	697,117	21.67
Iowa	40	569,810	356,225	1,121	927,156	3.58	414	178	73,871	12.55
Kansas	10	523,995	136,077	3,686	663,758	4.67	172	256	43,970	15.10
Kentucky	1,968	55,845,761	,120,041	65,941	63,031,743	4.06	24,378	170	4,145,170	15.21
Maryland	70	344,403	412,970	-----------	757,373	3.79	506	165	83,572	9.06
Missouri	28	1,794,105	377,635	766,243	2,937,983	4.28	2,106	122	256,493	11.45
Montana:										
Bituminous	12	55,364	41,891	163	97,418	6.76	120	149	17,847	5.46
Lignite	6	262,175	11,241	28	273,444	2.01	29	182	5,281	51.78
Total Montana	18	317,539	53,132	191	370,862	3.26	149	155	23,128	16.04
New Mexico	13	362,944	48,882	315	412,141	6.01	317	142	44,947	9.17
North Dakota (lignite)	32	1,925,124	441,256	359,890	2,726,270	2.25	330	204	67,198	40.57
Ohio	439	16,277,760	11,453,886	4,493,856	32,225,502	3.77	8,021	215	1,725,417	18.68
Oklahoma	27	933,572	97,814	154	1,031,540	6.58	596	194	115,496	8.93
Pennsylvania	1,220	49,378,848	11,562,948	1,710,299	62,652,095	5.17	27,357	196	5,357,992	11.69
South Dakota (lignite)	1	-----------	17,555	250	17,805	4.20	8	186	1,487	11.97
Tennessee	391	4,180,485	1,677,031	2,172	5,859,688	3.53	4,657	142	661,285	8.86
Utah	40	4,704,148	433,589	21,508	5,159,245	6.03	2,206	201	443,529	11.63
Virginia	1,179	26,631,008	3,392,458	308,832	30,332,298	4.16	14,039	202	2,832,107	10.71
Washington	10	128,561	58,330	3,854	190,745	7.24	190	179	33,956	5.62
West Virginia	1,646	106,595,219	4,194,742	2,280,487	113,070,448	4.94	43,611	200	8,705,869	12.99
Wyoming	18	1,554,950	878,546	95,312	2,528,808	3.39	507	161	81,444	31.05
Total	7,648	339,893,987	51,044,384	12,038,431	402,976,802	4.58	150,474	193	29,048,764	13.87

---

[1] Includes coal loaded at mine directly into railroad cars or river barges, hauled by trucks to railroad sidings, and hauled by trucks to waterways.

[2] Includes coal used at mine for power and heat, made into beehive coke at mine, used by mine employees, all other uses at mine, taken by locomotive tender, and transported from mine to point of use by conveyor, tram, or pipeline.

[3] Value received or charged for coal, f.o.b. mine. Includes a value, estimated by producer, for coal not sold.

TABLE 12.—Number of mines, production, value, men working daily, days active, man-days, and output per man per day at bituminous coal and lignite mines in the United States, 1961, by districts

District	Number of active mines	Production (net tons)				Average value per ton [3]	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day
		Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total					
1. Eastern Pennsylvania	927	22,737,300	5,540,747	972,218	29,250,265	$4.44	13,590	192	2,607,776	11.22
2. Western Pennsylvania	378	27,122,038	6,601,000	738,097	34,461,135	5.73	14,407	199	2.861,826	12.04
3. Northern West Virginia	550	34,167,374	1,386,438	38,874	35,592,686	4.68	12,264	199	2,439,639	14.59
4. Ohio	439	16,277,760	11,453,886	4,493,856	32,225,502	3.77	8,021	215	1,725,417	18.68
5. Michigan	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
6. Panhandle	18	2,000,235	271,572	1,929,593	4,201,400	4.46	1,194	220	263,048	15.97
7. Southern Numbered 1	729	30,050,939	1,535,018	252,608	31,838,565	5.81	14,921	198	2,960,746	10.75
8. Southern Numbered 2	3,621	96,644,299	11,110,969	428,834	108,184,102	4.42	51,391	182	9,328,466	11.60
9. West Kentucky	106	29,072,490	1,532,850	6.452	30,611,792	3.48	5,267	213	1,123,804	27.24
10. Illinois	114	40,515,264	4,599,311	130,988	45,245,563	3.91	8,855	215	1,906,634	23.73
11. Indiana	72	12,968,349	1,477,449	660,377	15,106,175	3.89	3,220	216	697,117	21.67
12. Iowa	40	569,810	356,225	1,121	927,156	3.58	414	178	73,871	12.55
13. Southeastern	340	11,858,123	1,618,530	1,006,938	14,483,591	6.66	8,073	186	1,503,529	9.63
14. Arkansas-Oklahoma	35	929,929	19,287	52	949,268	7.66	630	166	104,494	9.08
15. Southwestern	51	2,702,796	606,114	770,039	4,078,949	4.43	2,571	142	363,881	11.21
16. Northern Colorado	7	501,671	287,728	8,334	797,733	4.25	255	215	54,708	14.58
17. Southern Colorado	87	2,421,278	716,020	110,032	3,247,330	6.66	1,669	192	320,121	10.14
18. New Mexico	10	2,491	42,533	----------	45,024	5.74	158	63	9,917	4.54
19. Wyoming	18	1,554,950	878,546	95,312	2,528,808	3.39	507	161	81,444	31.05
20. Utah	40	4,704,148	433,589	21,508	5,159,245	6.03	2,206	201	443,529	11.63
21. North-South Dakota	33	1,925,124	458,811	360,140	2,744,075	2.27	338	203	68,685	39.95
22. Montana	18	317,539	53,132	191	370,862	3.26	149	155	23,128	16.04
23. Washington	15	850,080	64,629	12,867	927,576	7.81	374	233	86,984	10.66
Total	7,648	339,893,987	51,044,384	12,038,431	402,976,802	4.58	150,474	193	29,048,764	13.87

[1] Includes coal loaded at mine directly into railroad cars or river barges, hauled by trucks to railroad sidings, and hauled by trucks to waterways.

[2] Includes coal used at mine for power and heat, made into beehive coke at mine, used by mine employees, all other uses at mine, taken by locomotive tender, and transported from mine to point of use by conveyor, tram, or pipeline.

[3] Value received or charged for coal, f.o.b. mine. Includes a value, estimated by producer, for coal not sold.

NUMBER AND SIZE OF MINES

The unit in the statistical record is the mine, and operating companies are requested to make a separate report for each mine because its location is definitely known and can be related to a specific district or county; its identity can be followed through successive changes of ownership; and it is the natural operating unit from the standpoint of cost, mechanical equipment, mining practice, and output per man per day. See figure 6.

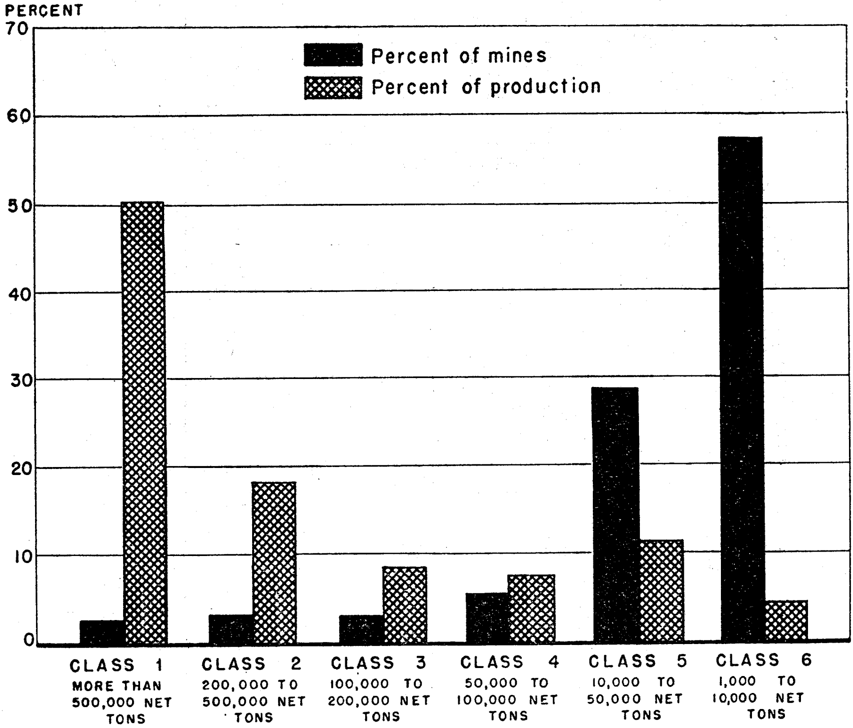

FIGURE 6.—Percentage of number of mines and of production of bituminous coal and lignite mines in the United States, 1961, by size of output.

TABLE 13.—Number and production of bituminous coal and lignite mines in the United States, 1961, by States and size of output

State	Class 1—500,000 tons and over				Class 2—200,000 to 500,000 tons				Class 3—100,000 to 200,000 tons			
	Mines		Production		Mines		Production		Mines		Production	
	Number	Percentage	Net tons	Percentage	Number	Percentage	Net tons	Percentage	Number	Percentage	Net tons	Percentage
Alabama	6	3.1	6,608,249	51.2	9	4.7	2,549,733	19.7	14	7.3	1,889,648	14.6
Alaska	---	---	---	---	1	20.0	358,836	48.7	3	60.0	334,995	45.5
Arkansas	---	---	---	---	---	---	---	---	---	---	---	---
Colorado	1	1.1	761,571	20.7	3	3.3	893,286	24.3	8	8.8	1,004,364	27.3
Georgia	---	---	---	---	---	---	---	---	---	---	---	---
Illinois	35	30.7	39,447,798	87.2	11	9.7	3,314,662	7.3	7	6.1	1,031,928	2.3
Indiana	13	18.1	11,779,314	78.0	6	8.3	2,146,577	14.2	2	2.8	248,257	1.6
Iowa	---	---	---	---	---	---	---	---	2	5.0	276,098	29.8
Kansas	1	10.0	530,566	79.9	---	---	---	---	---	---	---	---
Kentucky	27	1.4	30,835,343	48.9	25	1.3	7,818,117	12.4	46	2.3	6,152,523	9.8
Maryland	---	---	---	---	---	---	---	---	1	1.4	121,009	16.0
Missouri	2	7.2	1,618,332	55.1	2	7.1	713,163	24.3	3	10.7	418,202	14.2
Montana (bituminous and lignite)	---	---	---	---	1	5.5	262,175	70.7	---	---	---	---
New Mexico	---	---	---	---	1	7.7	360,768	87.5	---	---	---	---
North Dakota (lignite)	2	6.3	1,175,768	43.1	2	6.2	614,503	22.6	3	9.4	555,132	20.4
Ohio	15	3.4	16,048,333	49.8	13	3.0	3,967,413	12.3	24	5.5	3,727,086	11.6
Oklahoma	---	---	---	---	---	---	---	---	2	7.4	258,699	25.1
Pennsylvania	27	2.2	27,029,732	43.2	40	3.3	12,736,223	20.3	46	3.8	6,781,498	10.8
South Dakota (lignite)	---	---	---	---	---	---	---	---	---	---	---	---
Tennessee	---	---	---	---	2	.5	961,454	16.4	6	1.6	824,117	14.1
Utah	1	2.5	747,557	14.5	8	20.0	2,919,111	56.6	4	10.0	553,862	10.7
Virginia	3	.3	8,440,439	27.8	12	1.0	4,186,154	13.8	9	.8	1,238,229	4.1
Washington	---	---	---	---	---	---	---	---	1	10.0	119,249	62.5
West Virginia	61	3.7	57,078,694	50.5	85	5.2	28,029,712	24.8	60	3.6	8,036,046	7.1
Wyoming	1	5.6	821,437	32.5	4	22.2	1,285,971	50.8	1	5.5	122,793	4.9
Total	195	2.5	202,923,133	50.4	225	2.9	73,117,858	18.1	242	3.2	33,693,735	8.4

TABLE 13.—Number and production of bituminous coal and lignite mines in the United States, 1961, by States and size of output—Con.

State	Class 4—50,000 to 100,000 tons				Class 5—10,000 to 50,000 tons				Class 6—Less than 10,000 tons				Total		
	Mines		Production		Mines		Production		Mines		Production		Mines	Production (net tons)	
	Number	Percentage	Net tons	Percentage	Number	Percentage	Net tons	Percentage	Number	Percentage	Net tons	Percentage		Total	Average per mine
Alabama	5	2.6	382,595	3.0	47	24.3	1,037,465	8.0	112	58.0	447,775	3.5	193	12,915,465	66,920
Alaska	--------	--------	--------	--------	1	20.0	43,000	5.8	--------	--------	--------	--------	5	736,831	147,366
Arkansas	3	14.3	221,115	56.0	8	38.1	151,745	38.4	10	47.6	22,076	5.6	21	394,936	14,963
Colorado	5	5.5	382,548	10.4	20	22.0	425,186	11.6	54	59.3	210,991	5.7	91	3,677,946	40,417
Georgia	--------	--------	--------	--------	--------	--------	--------	--------	2	100.0	4,426	100.0	2	4,426	2,213
Illinois	11	9.6	862,493	1.9	23	20.2	480,477	1.1	27	23.7	108,205	.2	114	45,245,563	396,891
Indiana	6	8.3	359,727	2.4	17	23.6	433,857	2.9	28	38.9	138,443	.9	72	15,106,175	209,808
Iowa	3	7.5	189,403	20.4	15	37.5	369,846	39.9	20	50.0	91,809	9.9	40	927,156	23,179
Kansas	1	10.0	91,986	13.9	1	10.0	21,518	3.2	7	70.0	19,688	3.0	10	663,758	66,376
Kentucky	78	3.9	5,539,891	8.8	446	22.7	7,765,203	12.3	1,346	68.4	4,920,666	7.8	1,968	63,031,743	32,028
Maryland	1	1.4	56,501	7.5	18	25.7	365,244	48.2	50	71.5	214,619	28.3	70	757,373	10,820
Missouri	--------	--------	--------	--------	6	21.4	134,498	4.6	15	53.6	53,788	1.8	28	2,937,983	104,928
Montana (bituminous and lignite)	1	5.6	53,914	14.5	--------	--------	--------	--------	16	88.9	54,773	14.8	18	370,862	20,603
New Mexico	--------	--------	--------	--------	1	7.7	15,248	3.7	11	84.6	36,125	8.8	13	412,141	34,345
North Dakota (lignite)	1	3.1	87,916	3.2	9	28.1	226,744	8.3	15	46.9	66,207	2.4	32	2,726,270	85,196
Ohio	58	13.2	4,166,342	12.9	139	31.6	3,486,913	10.8	190	43.3	829,415	2.6	439	32,225,502	73,407
Oklahoma	7	25.9	547,963	53.1	8	29.6	198,922	19.3	10	37.1	25,956	2.5	27	1,031,540	38,205
Pennsylvania	87	7.1	6,433,939	10.3	313	25.6	7,021,472	11.2	707	58.0	2,649,231	4.2	1,220	62,652,095	51,354
South Dakota (lignite)	--------	--------	--------	--------	1	100.0	17,805	100.0	--------	--------	--------	--------	1	17,805	17,805
Tennessee	13	3.3	888,173	15.1	104	26.6	2,148,484	36.7	266	68.0	1,037,460	17.7	391	5,859,688	14,986
Utah	9	22.5	613,709	11.9	12	30.0	299,649	5.8	6	15.0	25,357	.5	40	5,159,245	128,981
Virginia	57	4.8	4,001,647	13.2	478	40.5	9,667,780	31.9	620	52.6	2,798,049	9.2	1,179	30,332,298	25,727
Washington	--------	--------	--------	--------	1	10.0	32,472	17.0	8	80.0	39,024	20.5	10	190,745	19,075
West Virginia	71	4.3	5,259,699	4.7	512	31.1	11,245,790	9.9	857	52.1	3,420,507	3.0	1,646	113,070,448	68,694
Wyoming	3	16.7	185,411	7.3	3	16.7	92,656	3.7	6	33.3	20,540	.8	18	2,528,808	140,489
Total	420	5.5	30,324,972	7.5	2,183	28.6	45,681,974	11.3	4,383	57.3	17,235,130	4.3	7,648	402,976,802	52,690

EMPLOYMENT AND PRODUCTIVITY

The bituminous coal and lignite industry has become highly mechanized in recent years. Mechanization has strongly affected production per man per day and the number of employees. In the past 20 years productivity has increased 167 percent, and the number of employees has declined 67 percent. See figure 7.

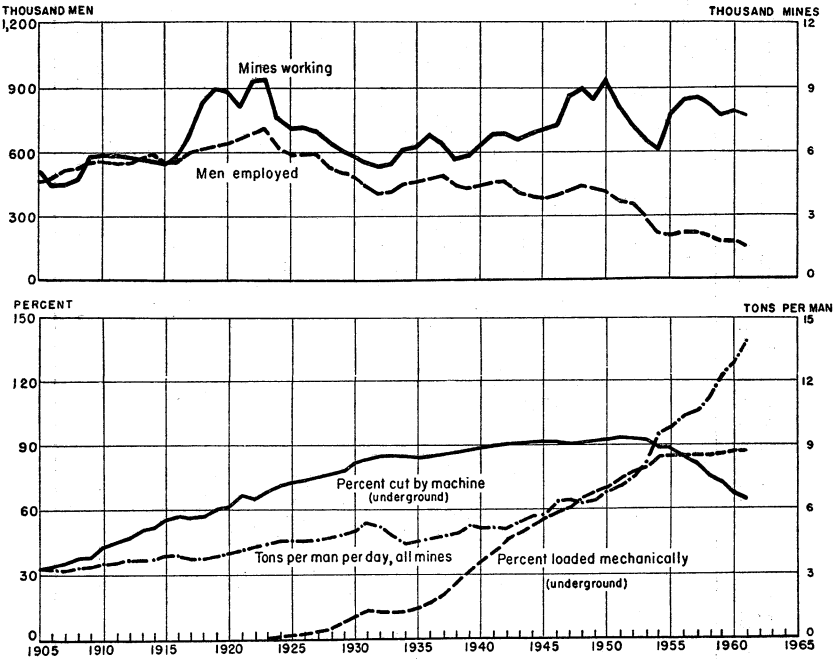

FIGURE 7.—Trends of employment, mechanization, and output per man at bituminous coal and lignite mines in the United States, 1905–61.

TABLE 14.—Production and average output per man per day at bituminous coal and lignite mines in the United States, 1961, by States and by underground, strip, and auger mining

State	Production (net tons)				Percentage of total production				Average tons per man per day			
	Underground	Strip	Auger	Total	Underground	Strip	Auger	Total	Underground	Strip	Auger	Total
Alabama	10,076,424	2,701,052	137,989	12,915,465	78.0	20.9	1.1	100.0	8.78	18.25	25.81	9.93
Alaska	109,294	627,537	------	736,831	14.8	85.2	------	100.0	16.79	13.49	------	13.90
Arkansas	164,595	230,341	------	394,936	41.7	58.3	------	100.0	4.96	11.97	------	7.53
Colorado	3,156,578	521,368	------	3,677,946	85.8	14.2	------	100.0	9.86	26.53	------	10.82
Georgia	4,426	------	------	4,426	100.0	------	------	100.0	2.68	------	------	2.68
Illinois	22,417,548	22,785,504	42,511	45,245,563	49.5	50.4	.1	100.0	19.35	30.51	34.17	23.73
Indiana	4,608,869	10,497,306	------	15,106,175	30.5	69.5	------	100.0	12.58	31.74	------	21.67
Iowa	147,556	779,600	------	927,156	15.9	84.1	------	100.0	4.79	18.11	------	12.55
Kansas	1,882	661,876	------	663,758	.3	99.7	------	100.0	2.08	15.37	------	15.10
Kentucky	38,821,875	21,453,691	2,756,177	63,031,743	61.6	34.0	4.4	100.0	11.18	38.05	25.21	15.21
Maryland	287,110	470,263	------	757,373	37.9	62.1	------	100.0	5.08	16.17	------	9.06
Missouri	70,946	2,867,037	------	2,937,983	2.4	97.6	------	100.0	2.42	12.62	------	11.45
Montana:												
Bituminous	89,758	7,660	------	97,418	92.1	7.9	------	100.0	5.57	4.41	------	5.46
Lignite	10,096	263,348	------	273,444	3.7	96.3	------	100.0	5.99	73.25	------	51.78
Total Montana	99,854	271,008	------	370,862	26.9	73.1	------	100.0	5.61	50.84	------	16.04
New Mexico	396,893	15,248	------	412,141	96.3	3.7	------	100.0	9.14	10.00	------	9.17
North Dakota (lignite)	1,981	2,724,289	------	2,726,270	.1	99.9	------	100.0	7.19	40.71	------	40.57
Ohio	8,510,516	22,463,370	1,251,616	32,225,502	26.4	69.7	3.9	100.0	10.99	24.28	48.25	18.68
Oklahoma	148,696	882,844	------	1,031,540	14.4	85.6	------	100.0	2.88	13.82	------	8.93
Pennsylvania	41,442,647	20,744,848	464,600	62,652,095	66.2	33.1	.7	100.0	10.00	17.37	21.42	11.69
South Dakota (lignite)	------	17,805	------	17,805	------	100.0	------	100.0	------	11.97	------	11.97
Tennessee	3,834,980	1,761,170	263,538	5,859,688	65.4	30.1	4.5	100.0	6.58	26.54	21.33	8.86
Utah	5,159,245	------	------	5,159,245	100.0	------	------	100.0	11.63	------	------	11.63
Virginia	28,209,849	1,412,341	710,108	30,332,298	93.0	4.7	2.3	100.0	10.18	31.91	39.36	10.71
Washington	184,363	6,382	------	190,745	96.7	3.3	------	100.0	5.82	2.81	------	5.62
West Virginia	104,605,171	5,860,083	2,605,194	113,070,448	92.5	5.2	2.3	100.0	12.48	23.36	34.75	12.99
Wyoming	304,687	2,224,121	------	2,528,808	12.0	88.0	------	100.0	7.67	53.30	------	31.05
Total	272,765,985	121,979,084	8,231,733	402,976,802	67.7	30.3	2.0	100.0	11.41	25.00	30.61	13.87

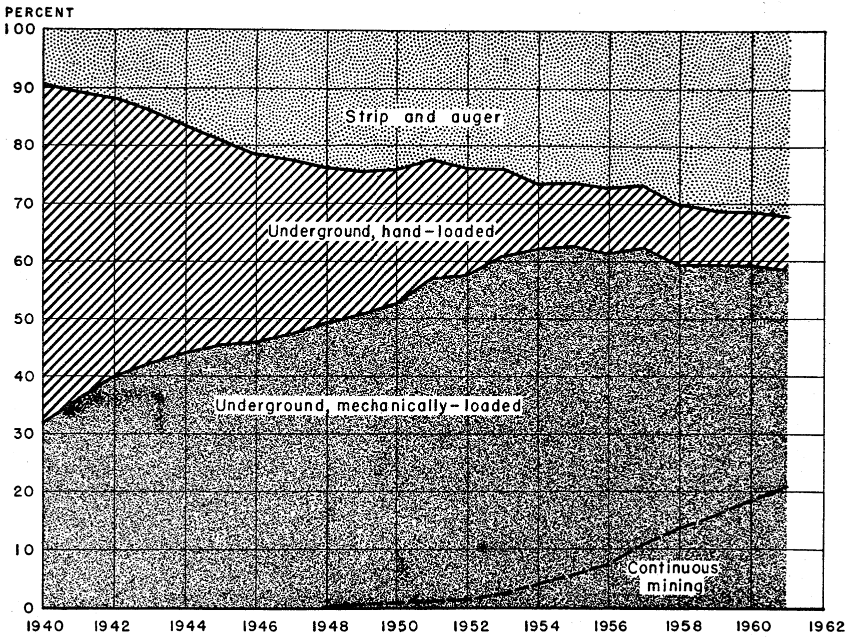

FIGURE 8.—Percentage of total production of bituminous coal and lignite in the United States, 1940–61, by type of mining and loading.

UNDERGROUND MINING

Two-thirds of the output of bituminous coal and lignite is mined underground. The major tasks underground are cutting, drilling shotholes, loading, and haulage. Loading is discussed later in the section on Mechanical Loading. For many years most of the underground production has been cut by machine; however, as the percentage of production by continuous-mining machines increases, the percentage cut by machines will decrease. The use of power drills for shotholes increased rapidly from less than 50 percent of the underground production in 1940 to a maximum of 84 percent in 1953. The use of continuous-mining machines decreased the tonnage power-drilled for shotholes to 67 percent of the underground output. Trolley locomotives are the principal method of underground haulage; however, in recent years the use of conveyor haulage has increased steadily.

The number and capacity of mine cars and the miles of rail track at underground mines are included for 1961 for the second time, and rubber-tired tractors and rubber-tired mine cars are included for 1961 for the first time. Mines producing 63 percent of the underground output reported 121,006 rail mine cars and 2,640 miles of rail track, while mines producing 2 percent used rubber-tired mine cars. Mines not reporting type of haulage produced 13 percent, and mines employing 100-percent conveyor haulage furnished the remaining 22 percent of the underground production. Usually, rail mine cars were of 4- to 5-ton capacity, and the greatest volume of tonnage was hauled in 4-

to 5-ton capacity cars. However, 9 percent of all rail mine cars were large, 10 tons and over, and hauled 22 percent of all tonnage. In contrast, the most frequent size of rubber-tired mine cars was 2-ton capacity; cars of this size hauled 49 percent of the tonnage.

TABLE 15.—Number of mines, production, men working daily, days active, man-days, and output per man per day at underground bituminous coal and lignite mines in the United States, 1961, by States

State	Number of active mines	Production (net tons)	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day
Alabama	145	10, 076, 424	5, 761	199	1, 147, 810	8. 78
Alaska	1	109, 294	22	296	6, 509	16. 79
Arkansas	11	164, 595	230	144	33, 173	4. 96
Colorado	85	3, 156, 578	1, 660	193	320, 144	9. 86
Georgia	2	4, 426	8	206	1, 651	2. 68
Illinois	52	22, 417, 548	5, 879	197	1, 158, 473	19. 35
Indiana	32	4, 608, 869	1, 805	203	366, 427	12. 58
Iowa	14	147, 556	216	143	30, 820	4. 79
Kansas	1	1, 882	7	129	905	2. 08
Kentucky	1, 754	38, 821, 875	20, 700	168	3, 472, 011	11. 18
Maryland	37	287, 110	372	152	56, 482	5. 08
Missouri	9	70, 946	186	158	29, 334	2. 42
Montana:						
Bituminous	10	89, 758	110	146	16, 111	5. 57
Lignite	4	10, 096	13	130	1, 686	5. 99
Total Montana	14	99, 854	123	145	17, 797	5. 61
New Mexico	12	396, 893	302	144	43, 422	9. 14
North Dakota (lignite)	1	1, 981	2	123	276	7. 19
Ohio	126	8, 510, 516	3, 925	197	774. 165	10. 99
Oklahoma	10	148, 696	268	193	51, 631	2. 88
Pennsylvania	635	41, 442, 647	21, 488	193	4, 142, 350	10. 00
Tennessee	314	3, 834, 980	4, 135	141	582, 562	6. 58
Utah	40	5, 159, 245	2, 206	201	443, 529	11. 63
Virginia	1, 109	28, 209, 849	13, 717	202	2, 769, 803	10. 18
Washington	9	184, 363	179	177	31, 685	5. 82
West Virginia	1, 421	104, 605. 171	41, 630	201	8, 380, 023	12. 48
Wyoming	9	304, 687	324	123	39, 719	7. 67
Total	5, 843	272, 765, 985	125, 145	191	23, 900, 701	11. 41

TABLE 16.—Underground production of bituminous coal and lignite in the United States, 1961, by States and mining methods

State	Cut by hand and shot from solid		Cut by machines				Mined by continuous-mining machines		Total underground (net tons)
	Net tons	Percentage of total underground	Net tons	Percentage of total underground	Number of coal-cutting machines	Average output per machine (net tons)	Net tons	Percentage of total underground	
Alabama	253,569	2.5	9,392,255	93.2	180	52,179	430,600	4.3	10,076,424
Alaska	82,436	75.4					26,858	24.6	109,294
Arkansas			138,322	84.0	36	3,842	26,273	16.0	164,595
Colorado	236,419	7.5	1,456,025	46.1	166	8,771	1,464,134	46.4	3,156,578
Georgia	4,426	100.0							4,426
Illinois	2,284		14,727,254	65.7	110	133,884	7,688,010	34.3	22,417,548
Indiana	4,944	.1	3,365,320	73.0	65	51,774	1,238,605	26.9	4,608,869
Iowa	22,736	15.4	124,820	84.6	14	8,916			147,556
Kansas			1,882	100.0	1	1,882			1,882
Kentucky	2,668,662	6.9	33,517,724	86.3	1,348	24,865	2,635,489	6.8	38,821,875
Maryland	44,283	15.4	242,827	84.6	36	6,745			287,110
Missouri			70,946	100.0	13	5,457			70,946
Montana:									
Bituminous			89,758	100.0	14	6,411			89,758
Lignite	8,170	80.9	1,926	19.1	2	963			10,096
Total Montana	8,170	8.2	91,684	91.8	16	5,730			99,854
New Mexico	15,675	3.9	20,450	5.2	10	2,045	360,768	90.9	396,893
North Dakota (lignite)	1,981	100.0							1,981
Ohio	26,384	.3	5,397,611	63.4	194	27,823	3,086,521	36.3	8,510,516
Oklahoma	3,112	2.1	145,584	97.9	47	3,098			148,696
Pennsylvania	701,697	1.7	12,857,469	33.0	840	15,307	27,883,481	67.3	41,442,647
Tennessee	637,262	16.6	3,068,134	80.0	207	14,822	129,584	3.4	3,834,980
Utah			3,259,718	63.2	99	32,926	1,899,527	36.8	5,159,245
Virginia	4,260,384	15.1	21,783,897	77.2	902	24,151	2,165,568	7.7	28,209,849
Washington	109,273	59.3	480	.2	1	480	74,610	40.5	184,363
West Virginia	2,933,286	2.8	66,497,784	63.6	1,706	38,979	35,174,101	33.6	104,605,171
Wyoming			267,565	87.8	30	8,919	37,122	12.2	304,687
Total	12,016,983	4.4	176,427,751	64.7	6,021	29,302	84,321,251	30.9	272,765,985

TABLE 17.—Summary of drilling operations at underground bituminous coal and lignite mines in the United States

Year	Number of mines using power drills	Number of power drills[1]					Production (thousand net tons)—				Production, percent—		
		Electric	Face or coal	Compressed air	Roof or rock	Total	Where shotholes are power-drilled	Where shotholes are hand-drilled	Where no shotholes are required (continuous mining)	Total	Where shotholes are power-drilled	Where shotholes are hand-drilled	Where no shotholes are required (continuous mining)
1936	599	3,968	----------	1,302	----------	5,270	111,950	299,012	----------	410,962	27.2	72.8	----------
1937	(2)	(2)	----------	(2)	----------	(2)	(2)	(2)	----------	413,780	(2)	(2)	----------
1938	1,061	5,071	----------	1,465	----------	6,536	122,581	195,557	----------	318,138	38.5	61.5	----------
1939	(2)	(2)	----------	(2)	----------	(2)	(2)	(2)	----------	357,133	(2)	(2)	----------
1940	1,172	6,613	----------	1,378	----------	7,991	197,083	220,521	----------	417,604	47.2	52.8	----------
1941	1 266	7,697	----------	1,502	----------	9,199	237,213	221,865	----------	459,078	51.7	48.3	----------
1942	1,364	8,482	----------	1,564	----------	10,046	281,530	233,960	----------	515,490	54.6	45.4	----------
1943	1,376	8,930	----------	1 630	----------	10,560	299,805	210,687	----------	510,492	58.7	41.3	----------
1944	1,501	9,755	----------	1,903	----------	11,658	324,116	194,562	----------	518,678	62.5	37.5	----------
1945	1,504	10,267	----------	1,855	----------	12,122	302,786	164,844	----------	467,630	64.7	35.3	----------
1946	1,702	10 968	----------	1,884	----------	12,852	278,734	142,224	----------	420,958	66.2	33.8	----------
1947	2 522	12,940	----------	1,449	----------	14,389	351,866	139,363	----------	491,229	71.6	28.4	----------
1948	2,798	13,970	----------	1 312	----------	15,282	336,873	122,689	450	460,012	73.2	26.7	0.1
1949	2,923	14,087	----------	1,411	----------	15,498	251,329	77,894	2,600	331,823	75.7	23.5	.8
1950	3,112	14,277	----------	1,282	----------	15,559	286,661	101,333	4,850	392,844	73.0	25.8	1.2
1951	3 027	14,231	----------	1,345	----------	15,576	324,645	85,136	6,061	415,842	78.0	20.5	1.5
1952	2,830	13,468	----------	1,292	----------	14,760	284,048	64,162	8,215	356,425	79.7	18.0	2.3
1953	2,486	12,054	----------	1,053	----------	13,107	293,161	44,560	11,830	349,551	83.9	12.7	3.4
1954	2,137	10,782	----------	885	----------	11,667	233,557	39,219	16,336	289,112	80.7	13.6	5.7
1955	2,003	9,533	----------	476	----------	10,009	285,348	30,657	27,460	343,465	83.1	8.9	8.0
1956	4,033	(1)	11,021	(1)	2,443	13,464	306,675	19,192	39,907	365,774	83.8	5.3	10.9
1957	4,152	(1)	10,938	(1)	2,981	13,919	294,186	12,680	53,783	360,649	81.6	3.5	14.9
1958	4,410	(1)	9,691	(1)	2,947	12,638	216,226	14,285	56,373	286,884	75.4	5.0	19.6
1959	3,979	(1)	8,524	(1)	2,814	11,338	207,043	10,599	65,792	283,434	73.1	3.7	23.2
1960	4,294	(1)	8,265	(1)	3,283	11,548	194,956	12,004	77,928	284,888	68.4	4.2	27.4
1961	4,333	(1)	7,837	(1)	3,153	10,990	181,741	6,704	84,321	272,766	66.6	2.5	30.9

---

[1] Total number of power drills before 1956 are not strictly comparable with the figures for 1956 to date. Data were collected by "type" of drills before 1956 and by "use" of drills 1956 to date. Most of the "electric" drills were used in coal and most of the "compressed air" drills were used in rock. "Face or coal" drills include handheld, post-mounted, and mobile drills. "Roof or rock" drills include rotary and percussion drills.

[2] Data not available.

TABLE 18.—Use of power drills in underground bituminous coal and lignite mines in the United States, 1961, by States

State	Number of mines using power drills	Number of power drills						Production where shotholes are power-drilled (net tons)			
		Face or coal drills		Roof or rock drills				Handheld and post-mounted drills	Mobile drills	Total	Percentage of total underground
				Roof bolting		Other uses					
		Handheld and post-mounted	Mobile	Rotary	Percussion	Rotary	Percussion				
Alabama	88	221	11	48	114	6	24	8, 674, 897	845, 782	9, 520, 679	94.5
Alaska	1	10	----------	----------	----------	----------	----------	82, 436	----------	82, 436	75.4
Arkansas	6	15	----------	----------	----------	3	----------	144, 719	----------	144, 719	87.9
Colorado	75	220	20	5	31	----------	4	1, 759, 954	159, 676	1, 919, 630	60.8
Illinois	51	45	103	107	----------	1	1	484, 719	14, 241, 150	14, 725, 869	65.7
Indiana	31	39	27	34	3	1	2	404, 767	2, 965, 497	3, 370, 264	73.1
Iowa	8	11	1	2	----------	----------	----------	72, 235	53, 216	125, 451	85.0
Kentucky	1, 209	1, 640	146	220	55	15	36	19, 255, 214	13, 481, 677	32, 736, 891	84.3
Maryland	27	42	----------	3	1	----------	----------	258, 022	----------	258, 022	89.9
Missouri	6	6	----------	3	----------	----------	----------	61, 833	----------	61, 833	87.2
Montana:											
Bituminous	10	15	1	----------	----------	----------	----------	83, 456	6, 302	89, 758	100.0
Lignite	4	8	----------	----------	----------	----------	----------	10, 096	----------	10, 096	100.0
Total Montana	14	23	1	----------	----------	----------	----------	93, 552	6, 302	99, 854	100.0
New Mexico	7	10	----------	----------	5	----------	----------	28, 027	----------	28, 027	7.1
North Dakota (lignite)	1	1	----------	----------	----------	----------	----------	1, 981	----------	1, 981	100.0
Ohio	115	155	49	63	4	----------	4	877, 768	4, 507, 185	5, 384, 953	63.3
Oklahoma	6	29	----------	1	----------	----------	----------	141, 005	----------	141, 005	94.8
Pennsylvania	321	712	66	286	417	49	122	8, 239, 718	4, 257, 392	12, 497, 110	30.2
Tennessee	158	281	2	6	8	5	4	3, 200, 071	15, 184	3, 215, 255	83.8
Utah	39	55	74	3	114	1	58	1, 691, 539	2, 351, 796	4, 043, 335	78.4
Virginia	1, 083	1, 350	19	57	121	3	8	20, 338, 836	4, 875, 794	25, 214, 630	89.4
Washington	8	42	----------	----------	----------	1	----------	106, 641	----------	106, 641	57.8
West Virginia	1, 072	2, 235	136	677	323	24	58	52, 030, 639	15, 730, 048	67, 760, 687	64.8
Wyoming	7	40	----------	12	----------	----------	----------	302, 211	----------	302, 211	99.2
Total	4, 333	7, 182	655	1, 527	1, 196	109	321	118, 250, 784	63, 490, 699	181, 741, 483	66.6

TABLE 19.—Number of underground bituminous coal and lignite mines and number of haulage units in use in the United States, in selected years [1]

Year	Underground mines	Locomotives				Rope-haulage units			Shuttle cars			Gathering and haulage conveyors	Animals
		Trolley	Battery	Other types	Total	Portable	Stationary	Total	Cable reel	Battery	Total		
1924	7,352	[2]12,765	1,515	443	14,723	(3)	(3)	649	(3)	(3)	(3)	(3)	36,352
1946	5,888	14,110	1,001	110	15,231	4,084	1,009	5,093	(3)	(3)	(3)	457	10,185
1948	7,108	14,617	904	74	15,595	3,886	1,044	4,930	(3)	(3)	(3)	755	10,834
1949	6,798	14,090	928	59	15,077	3,904	1,073	4,977	2,144	623	2,767	860	10,313
1950	7,559	13,822	949	62	14,833	4,225	1,037	5,262	2,872	512	3,294	1,013	10,033
1951	6,225	13,327	900	51	14,278	3,875	916	4,791	3,191	567	3,758	1,094	7,478
1952	5,632	12,545	812	41	13,398	3,584	852	4,436	3,382	462	3,844	1,066	6,555
1953	5,034	11,311	678	45	12,034	2,838	727	3,565	3,797	425	4,222	1,042	5,354
1954	4,653	10,155	762	38	10,955	1,926	781	2,707	4,400	431	4,831	1,081	5,409
1955	6,035	9,538	658	40	10,236	1,327	577	1,904	4,375	239	4,614	1,002	6,440
1956	6,542	9,445	861	102	10,408	1,420	575	1,995	4,757	257	5,014	1,114	6,097
1957	6,512	8,997	898	138	10,033	1,214	616	1,830	5,129	257	5,386	1,233	5,054
1958	6,319	8,057	920	138	9,115	926	538	1,464	4,871	259	5,130	1,235	4,678
1959	5,815	7,263	949	137	8,349	900	504	1,404	4,795	255	5,050	1,416	4,063
1960	5,989	6,922	946	173	8,041	892	510	1,402	4,722	236	4,958	1,566	3,503
1961	5,843	6,362	583	162	7,107	(4)	(4)	(4)	4,687	182	4,869	1,635	(4)

[1] Exclusive of lignite and Virginia semianthracite mines in 1946, 1948, and 1949.
[2] Includes combination trolley and battery locomotives.
[3] Data not available.
[4] Canvass discontinued.

TABLE 20.—Haulage units and length of rail track in use in bituminous coal and lignite underground mines in the United States, 1961, by States

State	Locomotives			Tractors, rubber-tired	Mine cars[1]		Shuttle cars		Shuttle buggies	Gathering and haulage conveyors		Rail track reported (miles)		
	Trolley	Battery	All others		Rail	Rubber-tired	Cable reel	Battery		Units	Miles	Main line	All other	Total
Alabama	264	1	----	26	4,692	5	226	2	----	58	22.4	114.3	66.3	180.6
Alaska	1	1	----	----	12	----	----	----	----	----	----	.5	.5	1.0
Arkansas	3	4	----	----	95	----	----	----	----	3	.2	1.3	----	1.3
Colorado	78	34	1	----	3,007	----	95	19	1	23	6.2	37.6	18.9	56.5
Illinois	163	29	----	----	3,127	----	271	3	1	129	52.6	61.5	13.0	74.5
Indiana	109	3	1	----	1,694	----	98	----	1	23	6.1	52.6	27.9	80.5
Iowa	4	2	----	----	571	----	2	2	----	----	----	3.9	.4	4.3
Kentucky	933	68	32	110	10,557	496	680	41	373	151	42.9	307.4	127.7	435.1
Maryland	10	7	2	1	233	1	1	1	7	1	.4	5.9	3.1	9.0
Missouri	----	2	----	----	201	----	----	----	----	----	----	2.7	.6	3.3
Montana:														
Bituminous	13	1	----	----	252	----	5	----	----	----	----	5.6	1.5	7.1
Lignite	----	----	----	3	30	3	----	----	----	----	----	.2	----	.2
Total Montana	13	1	----	3	282	3	5	----	----	----	----	5.8	1.5	7.3
New Mexico	10	3	----	1	265	----	10	----	----	1	.5	7.3	3.4	10.7
Ohio	181	24	1	3	3,421	12	108	----	----	37	13.3	55.7	22.7	78.4
Oklahoma	----	5	----	----	24	----	----	----	----	----	----	1.2	.2	1.4
Pennsylvania	1,685	133	39	19	36,926	45	939	27	19	295	84.7	810.2	367.5	1,177.7
Tennessee	91	16	2	18	1,068	120	42	----	71	10	3.0	31.9	6.6	38.5
Utah	133	8	----	2	3,383	2	174	5	----	44	10.1	74.0	26.9	100.9
Virginia	710	130	45	399	5,399	2,264	248	4	51	118	44.3	142.9	47.8	190.7
Washington	16	----	----	----	467	----	4	----	----	----	----	5.3	----	5.3
West Virginia	1,948	108	39	115	45,074	----	1,767	78	416	739	225.0	906.3	380.8	1,287.1
Wyoming	10	4	----	----	508	511	17	----	----	3	.9	11.9	9.5	21.4
Total	6,362	583	162	697	121,006	3,459	4,687	182	940	1,635	512.6	2,640.2	1,125.3	3,765.5

[1] See table 21 for percentage coverage.

TABLE 21.—Method of haulage at bituminous coal and lignite underground mines in the United States, 1961, by States

State	Production (net tons) from mines—					Precentage of total underground production, from mines—				
	Reporting rail mine cars	Reporting rubber-tired mine cars	With conveyor haulage only	Not reporting type of haulage	Total	Reporting rail mine cars	Reporting rubber-tired mine cars	With conveyor haulage only	Not reporting type of haulage	Total
Alabama	5, 668, 893	-----	3, 403, 055	1, 004, 476	10, 076, 424	56. 2	-----	33. 8	10. 0	100. 0
Alaska	109, 294	-----	-----	-----	109, 294	100. 0	-----	-----	-----	100. 0
Arkansas	43, 660	-----	66, 651	54, 284	164, 595	26. 5	-----	40. 5	33. 0	100. 0
Colorado	1, 557, 470	-----	1, 321, 799	277, 309	3, 156, 578	49. 3	-----	41. 9	8. 8	100. 0
Illinois	4, 929, 656	-----	16, 789, 209	698, 683	22, 417, 548	22. 0	-----	74. 9	3. 1	100. 0
Indiana	3, 490, 854	-----	1, 094, 550	23, 465	4, 608, 869	75. 7	-----	23. 8	. 5	100. 0
Iowa	132, 006	-----	-----	15, 550	147, 556	89. 5	-----	-----	10. 5	100. 0
Kentucky	15, 413, 387	1, 265, 373	10, 624, 679	11, 518, 436	38, 821, 875	39. 7	3. 2	27. 4	29. 7	100. 0
Maryland	104, 885	5, 552	30, 272	146, 401	287, 110	36. 5	1. 9	10. 6	51. 0	100. 0
Missouri	43, 129	-----	-----	27, 817	70, 946	60. 8	-----	-----	39. 2	100. 0
Montana:										
Bituminous	87, 040	-----	-----	2, 718	89, 758	97. 0	-----	-----	3. 0	100. 0
Lignite	4, 093	1, 926	-----	4, 077	10, 096	40. 5	19. 1	-----	40. 4	100. 0
Total Montana	91, 133	1, 926	-----	6, 795	99, 854	91. 3	1. 9	-----	6. 8	100. 0
New Mexico	388, 163	-----	-----	8, 730	396, 893	97. 8	-----	-----	2. 2	100. 0
Ohio	6, 462, 237	15, 551	1, 813, 685	219, 043	8, 510, 516	75. 9	. 2	21. 3	2. 6	100. 0
Oklahoma	5, 665	-----	-----	143, 031	148, 696	3. 8	-----	-----	96. 2	100. 0
Pennsylvania	38, 102, 363	125, 668	1, 734, 072	1, 480, 544	41, 442, 647	91. 9	. 3	4. 2	3. 6	100. 0
Tennessee	1, 820, 945	150, 071	163, 643	1, 700, 321	3, 834, 980	47. 5	3. 9	4. 3	44. 3	100. 0
Utah	4, 403, 236	18, 491	544, 206	193, 312	5, 159, 245	85. 3	. 4	10. 6	3. 7	100. 0
Virginia	8, 726, 960	4, 036, 215	6, 282, 371	9, 164, 303	28, 209, 849	30. 9	14. 3	22. 3	32. 5	100. 0
Washington	173, 473	-----	-----	10, 890	184, 363	94. 1	-----	-----	5. 9	100. 0
West Virginia	79, 532, 858	892, 676	16, 202, 864	7, 976, 773	104, 605, 171	76. 0	. 9	15. 5	7. 6	100. 0
Wyoming	225, 615	-----	-----	79, 072	304, 687	74. 0	-----	-----	26. 0	100. 0
Other States [1]	-----	-----	-----	8, 289	8, 289	-----	-----	-----	100. 0	100 0
Total	171, 425, 882	6, 511, 523	60, 071, 056	34, 757, 524	272, 765, 985	62. 9	2. 4	22. 0	12. 7	100. 0

[1] Includes Georgia, Kansas, and North Dakota (lignite).

TABLE 22.—Rail mine cars used at bituminous coal and lignite underground mines in the United States, 1961, by States [1]

State	Capacity						
	1 ton	2 tons	3 tons	4-5 tons	6-9 tons	10 tons and over	Total
	NUMBER REPORTED						
Alabama	138	306	520	2,076	1,652	----------	4,692
Alaska	----------	----------	----------	12	----------	----------	12
Arkansas	12	63	20	----------	----------	----------	95
Colorado	130	2,044	602	231	----------	----------	3,007
Illinois	605	1,373	94	173	843	39	3,127
Indiana	100	185	415	594	400	----------	1,694
Iowa	409	148	14	----------	----------	----------	571
Kentucky	710	2,282	2,665	3,073	570	1,257	10,557
Maryland	120	109	4	----------	----------	----------	233
Missouri	201	----------	----------	----------	----------	----------	201
Montana:							
Bituminous	----------	62	175	15	----------	----------	252
Lignite	30	----------	----------	----------	----------	----------	30
Total Montana	30	62	175	15	----------	----------	282
New Mexico	92	79	----------	----------	94	----------	265
Ohio	760	765	506	26	849	515	3,421
Oklahoma	----------	3	11	10	----------	----------	24
Pennsylvania	5,312	7,088	7,998	3,630	10,400	2,498	36,926
Tennessee	396	161	60	371	80	----------	1,068
Utah	----------	21	285	1,836	1,241	----------	3,383
Virginia	716	761	851	1,889	486	696	5,399
Washington	25	415	----------	27	----------	----------	467
West Virginia	289	3,711	10,135	19,570	5,930	5,439	45,074
Wyoming	----------	12	----------	496	----------	----------	508
Total	10,045	19,588	24,355	34,029	22,545	10,444	121,006
	PERCENTAGE OF TOTAL						
Alabama	3.0	6.5	11.1	44.2	35.2	----------	100.0
Alaska	----------	----------	----------	100.0	----------	----------	100.0
Arkansas	12.6	66.3	21.1	----------	----------	----------	100.0
Colorado	4.3	68.0	20.0	7.7	----------	----------	100.0
Illinois	19.3	43.9	3.0	5.5	27.0	1.3	100.0
Indiana	5.9	10.9	24.5	35.1	23.6	----------	100.0
Iowa	71.6	25.9	2.5	----------	----------	----------	100.0
Kentucky	6.7	21.6	25.3	29.1	5.4	11.9	100.0
Maryland	51.5	46.8	1.7	----------	----------	----------	100.0
Missouri	100.0	----------	----------	----------	----------	----------	100.0
Montana:							
Bituminous	----------	24.6	69.4	6.0	----------	----------	100.0
Lignite	100.0	----------	----------	----------	----------	----------	100.0
Total Montana	10.6	22.0	62.1	5.3	----------	----------	100.0
New Mexico	34.7	29.8	----------	----------	35.5	----------	100.0
Ohio	22.2	22.4	14.8	.8	24.8	15.0	100.0
Oklahoma	----------	12.5	45.8	41.7	----------	----------	100.0
Pennsylvania	14.4	19.2	21.6	9.8	28.2	6.8	100.0
Tennessee	37.1	15.1	5.6	34.7	7.5	----------	100.0
Utah	----------	.6	8.4	54.3	36.7	----------	100.0
Virginia	13.2	14.1	15.8	35.0	9.0	12.9	100.0
Washington	5.3	88.9	----------	5.8	----------	----------	100.0
West Virginia	.6	8.2	22.5	43.4	13.2	12.1	100.0
Wyoming	----------	2.4	----------	97.6	----------	----------	100.0
Total	8.3	16.2	20.1	28.1	18.7	8.6	100.0

[1] See table 21 for percentage coverage.

TABLE 23.—Rail mine car haulage at bituminous coal and lignite underground mines in the United States, 1961, by States [1]

State	Production, by size of mine car reported						
	1 ton	2 tons	3 tons	4–5 tons	6–9 tons	10 tons and over	Total
	NET TONS						
Alabama	77,134	254,969	293,703	1,965,901	3,077,186		5,668,893
Alaska				109,294			109,294
Arkansas	10,000	16,176	17,484				43,660
Colorado	48,056	1,016,518	166,760	326,136			1,557,470
Illinois	186,952	595,301	147,203	726,532	2,948,599	325,069	4,929,656
Indiana	31,087	169,756	711,343	1,987,393	591,275		3,490,854
Iowa	33,382	74,100	24,524				132,006
Kentucky	289,621	2,059,400	2,885,675	5,231,368	1,045,303	3,902,020	15,413,387
Maryland	60,441	22,944	21,500				104,885
Missouri	43,129						43,129
Montana:							
Bituminous		16,497	64,241	6,302			87,040
Lignite	4,093						4,093
Total Montana	4,093	16,497	64,241	6,302			91,133
New Mexico	23,099	4,296			360,768		388,163
Ohio	337,647	285,183	1,377,538	22,908	2,045,791	2,393,170	6,462,237
Oklahoma		1,857	2,383	1,425			5,665
Pennsylvania	1,799,032	2,470,286	4,486,662	4,428,902	17,218,174	7,699,307	38,102,363
Tennessee	197,779	71,021	102,596	1,258,501	191,048		1,820,945
Utah		19,881	94,330	2,008,916	2,280,109		4,403,236
Virginia	429,460	1,018,771	993,563	1,800,583	1,033,262	3,451,321	8,726,960
Washington	2,845	123,501		47,127			173,473
West Virginia	435,344	3,775,321	11,088,521	28,936,109	15,290,734	20,006,829	79,532,858
Wyoming		7,614		218,001			225,615
Total	4,009,101	12,003,392	22,478,026	49,075,398	46,082,249	37,777,716	171,425,882

PERCENTAGE OF TOTAL

Alabama	1.3	4.5	5.2	34.7	54.3		100.0
Alaska				100.0			100.0
Arkansas	22.9	37.0	40.1				100.0
Colorado	3.1	65.3	10.7	20.9			100.0
Illinois	3.8	12.1	3.0	14.7	59.8	6.6	100.0
Indiana	.9	4.9	20.4	56.9	16.9		100.0
Iowa	25.3	56.1	18.6				100.0
Kentucky	1.9	13.4	18.7	33.9	6.8	25.3	100.0
Maryland	57.6	21.9	20.5				100.0
Missouri	100.0						100.0
Montana:							
Bituminous		19.0	73.8	7.2			100.0
Lignite	100.0						100.0
Total Montana	4.5	18.1	70.5	6.9			100.0
New Mexico	6.0	1.1			92.9		100.0
Ohio	5.2	4.4	21.3	.4	31.7	37.0	100.0
Oklahoma		32.8	42.1	25.1			100.0
Pennsylvania	4.7	6.5	11.8	11.6	45.2	20.2	100.0
Tennessee	10.9	3.9	5.6	69.1	10.5		100.0
Utah		.5	2.1	45.6	51.8		100.0
Virginia	4.9	11.7	11.4	20.6	11.8	39.6	100.0
Washington	1.6	71.2		27.2			100.0
West Virginia	.5	4.7	14.0	36.4	19.2	25.2	100.0
Wyoming		3.4		96.6			100.0
Total	2.4	7.0	13.1	28.6	26.9	22.0	100.0

---

[1] See table 21 for percentage coverage.

TABLE 24.—Rubber-tired mine cars used at bituminous coal and lignite underground mines in the United States, 1961, by States [1]

State	Capacity						
	1 ton	2 tons	3 tons	4-5 tons	6-9 tons	10 tons and over	Total
NUMBER REPORTED							
Kentucky	232	200	9	42	11	2	496
Maryland	1	-	-	-	-	-	1
Montana (lignite)	-	3	-	-	-	-	3
Ohio	6	6	-	-	-	-	12
Pennsylvania	11	18	16	-	-	-	45
Tennessee	37	83	-	-	-	-	120
Utah	-	-	-	-	-	2	2
Virginia	935	1,127	123	62	-	17	2,264
West Virginia	127	322	41	4	2	15	511
Total	1,349	1,759	189	108	13	36	3,454
PERCENTAGE OF TOTAL							
Kentucky	46.8	40.3	1.8	8.5	2.2	.4	100.0
Maryland	100.0	-	-	-	-	-	100.0
Montana (lignite)	-	100.0	-	-	-	-	100.0
Ohio	50.0	50.0	-	-	-	-	100.0
Pennsylvania	24.4	40.0	35.6	-	-	-	100.0
Tennessee	30.8	69.2	-	-	-	-	100.0
Utah	-	-	-	-	-	100.0	100.0
Virginia	41.3	49.8	5.4	2.7	-	.8	100.0
West Virginia	24.9	63.0	8.0	.8	.4	2.9	100.0
Total	39.1	50.9	5.5	3.1	.4	1.0	100.0

---

[1] See table 21 for percentage coverage.

TABLE 25.—Rubber-tired mine car haulage at bituminous coal and lignite underground mines in the United States, 1961, by States [1]

State	Production, by size of mine car reported						
	1 ton	2 tons	3 tons	4-5 tons	6-9 tons	10 tons and over	Total
			NET TONS				
Kentucky	520,188	416,362	74,551	206,780	29,650	17,842	1,265,373
Maryland	5,552	-----	-----	-----	-----	-----	5,552
Montana (lignite)	-----	1,926	-----	-----	-----	-----	1,926
Ohio	1,281	14,270	-----	-----	-----	-----	15,551
Pennsylvania	-----	86,720	38,948	-----	-----	-----	125,668
Tennessee	13,090	136,981	-----	-----	-----	-----	150,071
Utah	-----	-----	-----	-----	-----	18,491	18,491
Virginia	1,424,334	2,019,941	348,977	198,847	-----	44,116	4,036,215
West Virginia	154,946	532,981	111,445	2,388	4,117	86,799	892,676
Total	2,119,391	3,209,181	573,921	408,015	33,767	167,248	6,511,523
			PERCENTAGE OF TOTAL				
Kentucky	41.1	32.9	5.9	16.4	2.3	1.4	100.0
Maryland	100.0	-----	-----	-----	-----	-----	100.0
Montana (lignite)	-----	100.0	-----	-----	-----	-----	100.0
Ohio	8.2	91.8	-----	-----	-----	-----	100.0
Pennsylvania	-----	69.0	31.0	-----	-----	-----	100.0
Tennessee	8.7	91.3	-----	-----	-----	-----	100.0
Utah	-----	-----	-----	-----	-----	100.0	100.0
Virginia	35.3	50.1	8.6	4.9	-----	1.1	100.0
West Virginia	17.4	59.7	12.5	.2	.5	9.7	100.0
Total	32.5	49.3	8.8	6.3	.5	2.6	100.0

[1] See table 21 for percentage coverage.

TABLE 26.—Number and production of underground bituminous coal and lignite mines using gathering and haulage conveyors, and number and length of units in use in the United States [1]

Year	Number of mines	Production (net tons)	Number of units in use	Average length (feet)	Total length (miles)
1945	117	40, 189, 857	359	1, 438	97. 6
1946	161	46, 022, 710	457	1, 484	128. 5
1947	199	70. 690. 920	594	1, 470	165. 3
1948	270	81, 821. 361	755	1, 460	208. 8
1949	314	69, 947, 713	860	1, 514	246. 7
1950	374	92, 413, 644	1, 013	1, 538	294. 9
1951	372	99, 643, 003	1, 094	1, 568	325. 0
1952	358	92, 168, 992	1, 066	1, 526	308. 2
1953	322	100, 155, 249	1, 042	1, 541	303. 9
1954	291	83, 211, 284	1, 081	1, 626	32. 9
1955	314	97, 677, 313	1, 002	1, 682	319. 6
1956	314	126, 717, 518	1, 114	1, 656	349. 4
1957	362	136, 914, 192	1, 233	1 672	390. 4
1958	366	115, 419, 740	1, 235	1, 711	400. 3
1959	371	126, 654, 911	1, 416	1, 723	461. 8
1960	396	137, 053, 564	1, 566	1, 673	499. 2
1961	414	140. 938, 297	1, 635	1, 655	512. 6

[1] Includes all gathering and haulage conveyors with capacity over 500 feet, except main-slope conveyors. Excludes lignite and Virginia semianthracite mines in 1945–49.

TABLE 27.—Number and production of underground bituminous coal and lignite mines using gathering and haulage conveyors, and number and length of units in use in the United States, by States [1]

State	Number of mines		Production (net tons)		Number of units in use		Average length (feet)		Total length (miles)	
	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961
Alabama	7	7	4, 362, 743	4, 688, 851	58	58	2, 000	2, 035	22. 0	22. 4
Alaska	1	------	65, 887	------	1	------	1, 800	------	. 3	------
Arkansas	1	1	33, 253	66, 651	3	3	1, 000	1. 000	. 6	. 2
Colorado	6	7	869. 229	1, 451, 251	20	23	1, 438	1, 420	5. 4	6. 2
Illinois	16	15	19, 209, 646	18, 860, 233	128	129	2, 100	2, 153	50. 9	52. 6
Indiana	5	6	2, 854, 437	3, 429, 334	21	23	1, 103	1, 391	4. 4	6. 1
Kentucky	45	39	18, 128, 500	15, 007, 358	170	151	1, 537	1, 500	49. 5	42. 9
Maryland	------	1	------	30. 272	------	1	------	2, 000	------	. 4
New Mexico	1	1	203, 489	360, 768	1	1	600	2, 400	. 1	. 5
Ohio	11	13	4, 599, 662	4, 594, 109	33	37	1, 839	1, 892	11. 5	13. 3
Pennsylvania	69	62	19, 295, 481	19, 462, 581	322	295	1, 584	1. 515	96. 6	84. 7
Tennessee	7	6	411, 083	354. 691	21	10	1, 396	1, 600	5. 6	3. 0
Utah	19	16	3, 742, 320	3, 499, 236	48	44	1, 528	1, 207	13. 9	10. 1
Virginia	14	16	7, 562, 294	10, 496, 524	59	118	2, 218	1, 980	24. 8	44. 3
Washington	1	------	7, 839	------	3	------	2. 000	------	1. 1	------
West Virginia	192	223	55, 653, 973	58, 578. 352	675	739	1, 655	1, 607	211. 6	225. 0
Wyoming	1	1	53, 728	58, 086	3	3	1, 500	1, 500	. 9	. 9
Total	396	414	137, 053, 564	140, 938, 297	1, 566	1, 635	1, 673	1, 655	499. 2	512. 6

[1] Includes all mines using belt conveyors, other than main-slope conveyors, 500 feet long or more for transporting coal underground.

STRIP MINING

Strip mines have two substantial advantages over underground mines: (1) The output per man per day in strip mines is more than double that in underground mines, and (2) the average value of strip coal, f.o.b. mines, is about one-third less than the average value of coal from underground mines. See figures 9 and 10.

The rapid growth of strip mining was made possible by the development of larger and improved stripping and drilling equipment and trucks. The most notable recent change in stripping equipment has been replacement of virtually all steam shovels by diesel-powered and large electric shovels and draglines.

An increase in the average capacity of trucks used in strip mines has reduced the number required. The average hauling distance from strip mines to tipples or ramps is approximately 4 miles.

The average thickness of overburden at all bituminous coal and lignite strip mines in the United States was 46 feet in 1960, the latest year for which figures are available. Several strip mines handled an average of more than 70 feet of overburden in 1960, and a few handled more than 80 feet.

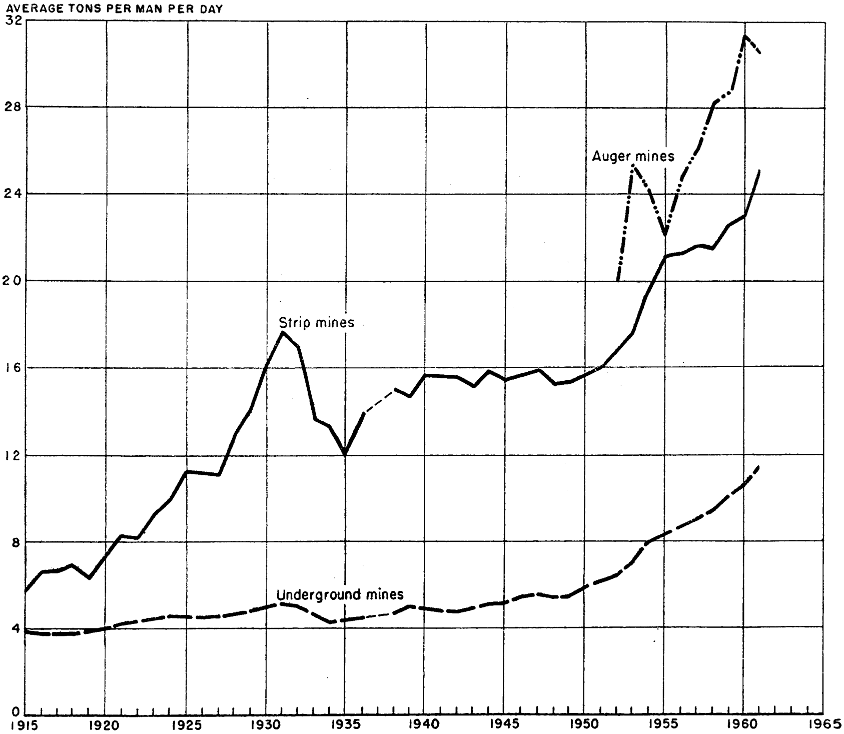

FIGURE 9.—Average tons per man per day at bituminous coal and lignite mines in the United States, 1915–61, by underground, strip, and auger mines.

TABLE 28.—Growth of strip mining at bituminous coal and lignite mines in the United States, compared with underground and auger mining

Year	Production (thousand net tons)				Percentage of total mined by stripping	Average tons per man per day				Average value per ton f.o.b. mine				Number of strip mines	Number of power shovels and draglines
	Underground mines	Strip mines [1]	Auger mines	Total		Underground mines	Strip mines [1]	Auger mines	Total	Underground mines	Strip mines [1]	Auger mines	Total		
1914	421,423	1,281	----------	422,704	0.3	3.71	5.06	----------	3.71	(2)	(2)	----------	$1,17	[3] 35	48
1915	439,792	2,832	----------	442,624	.6	3.90	5.81	----------	3.91	$1.13	$1.18	----------	1.13	[3] 60	87
1916	498,587	3,933	----------	502,520	.8	3.88	6.67	----------	3.90	1.32	1.51	----------	1.32	[3] 79	111
1917	546,001	5,790	----------	551,791	1.0	3.75	6.52	----------	3.77	2.26	2.34	----------	2.26	[3] 126	182
1918	571,098	8,288	----------	579,386	1.4	3.76	6.81	----------	3.78	2.58	2.54	----------	2.58	[3] 165	276
1919	460,225	5,635	----------	465,860	1.2	3.82	6.21	----------	3.84	2.49	2.33	----------	2.49	[3] 168	287
1920	559,807	8,860	----------	568,667	1.5	3.97	7.20	----------	4.00	3.74	4.12	----------	3.75	[3] 174	312
1921	410,865	5,057	----------	415,922	1.2	4.18	8.28	----------	4.20	2.89	2.87	----------	2.89	[3] 155	279
1922	412,059	10,209	----------	422,268	2.4	4.24	8.09	----------	4.28	3.02	3.07	----------	3.02	272	379
1923	552,625	11,940	----------	564,565	2.1	4.43	9.32	----------	4.47	2.69	2.31	----------	2.68	263	442
1924	470,080	13,607	----------	483,687	2.8	4.50	9.91	----------	4.56	2.20	2.00	----------	2.20	234	420
1925	503,182	16,871	----------	520,053	3.2	4.45	11.18	----------	4.52	2.05	1.84	----------	2.04	227	389
1926	556,444	16,923	----------	573,367	3.0	4.42	11.13	----------	4.50	2.07	1.89	----------	2.06	237	410
1927	499,385	18,378	----------	517,763	3.6	4.47	11.06	----------	4.55	1.99	1.90	----------	1.99	255	455
1928	480,956	19,789	----------	500,745	4.0	4.61	13.02	----------	4.73	1.87	1.69	----------	1.86	250	415
1929	514,721	20,268	----------	534,989	3.8	4.73	14.08	----------	4.85	1.79	1.57	----------	1.78	200	411
1930	447,684	19,842	----------	467,526	4.3	4.93	16.21	----------	5.06	1.71	1.54	----------	1.70	218	341
1931	363,157	18,932	----------	382,089	5.0	5.12	17.68	----------	5.30	1.54	1.51	----------	1.54	235	314
1932	290,069	19,641	----------	309,710	6.3	4.99	16.95	----------	5.22	1 31	1.32	----------	1.31	255	332
1933	315,360	18,270	----------	333,630	5.5	4.60	13.59	----------	4.78	1.34	1.33	----------	1.34	289	389
1934	338,578	20,790	----------	359,368	5.8	4.23	13.28	----------	4.40	1.76	1.49	----------	1.75	344	458

1935	348,726	23,647	----------	362,372	6.4	4.32	12.01	----------	4.50	1.79	1.47	----------	1.77	368	507
1936	410,962	28,126	----------	439,088	6.4	4.42	13.91	----------	4.62	1.77	1.49	----------	1.76	381	562
1937	413,780	31,751	----------	445,531	7.1	(2)	(2)	----------	4.69	(2)	(2)	----------	1.94	449	(2)
1938	318,138	30,407	----------	348,545	8.7	4.60	15.00	----------	4.89	(2)	(2)	----------	1.95	465	737
1939	357,133	37,722	----------	394,855	9.6	4.92	14.68	----------	5.25	1.88	1.49	----------	1.84	537	914
1940	417,604	43,167	----------	460,771	9.4	4.86	15.63	----------	5.19	1.94	1.56	----------	1.91	638	1,071
1941	459,078	55,071	----------	514,149	10.7	4.83	15.59	----------	5.20	2.23	1.79	----------	2.19	769	1,321
1942	515,490	67,203	----------	582,693	11.5	4.74	15.52	----------	5.12	2.41	1.90	----------	2.36	834	1,438
1943	510,492	79,685	----------	590,177	13.5	4.89	15.15	----------	5.38	2.75	2.28	----------	2.69	1,004	1,839
1944	518,678	100,898	----------	619,576	16.3	5.04	15.89	----------	5.67	3.01	2.48	----------	2.92	1,240	2,312
1945	467,630	109,987	----------	577,617	19.0	5.04	15.46	----------	5.78	3.16	2.65	----------	3.06	1,370	2,439
1946	420,958	112,964	----------	533,922	21.1	5.43	15.73	----------	6.30	3.59	2.87	----------	3.44	1,445	2,744
1947	491,229	139,395	----------	630,624	22.1	5.49	15.93	----------	6.42	4.35	3.47	----------	4.16	1,750	3,254
1948	460,012	139,506	----------	599,518	23.3	5.31	15.28	----------	6.26	5.26	4.11	----------	4.99	1,971	3,712
1949	331,823	106,045	----------	437,868	24.2	5.42	15.33	----------	6.43	5.18	3.94	----------	4.88	1,761	3,576
1950	392,844	123,467	----------	516,311	23.9	5.75	15.66	----------	6.77	5.15	3.87	----------	4.84	1,870	3,877
1951	415,842	117,618	205	533,665	22.0	6.08	16.02	----------	7.04	5.21	3.88	----------	4.92	1,784	3,810
1952	356,425	108,910	1,506	466,841	23.3	6.37	16.77	20.07	7.47	5.24	3.81	$4.31	4.90	1,643	3,527
1953	349,551	105,448	2,291	457,290	23.1	7.01	17.62	25.30	8.17	5.27	3.75	4.15	4.92	1,554	3,390
1954	289,112	98,134	4,460	391,706	25.1	7.99	19.64	24.12	9.47	4.87	3.52	3.41	4.52	1,329	3,409
1955	343,465	115,093	6,075	464,633	24.8	8.28	21.12	22.22	9.84	4.86	3.48	3.60	4.50	1,617	3,265
1956	365,774	127,055	8,045	500,874	25.4	8.62	21.18	24.85	10.28	5.20	3.74	4.17	4.82	1,728	3,705
1957	360,649	124,109	7,946	492,704	25.2	8.91	21.64	26.19	10.59	5.52	3.89	4.12	5.08	1,756	3,723
1958	286,884	116,242	7,320	410,446	28.3	9.38	21.54	28.15	11.33	5.33	3.80	3.60	4.86	1,646	3,515
1959	283,434	120,953	7,641	412,028	29.4	10.08	22.65	28.77	12.22	5.23	3.76	3.83	4.77	1,594	3,417
1960	284,888	122,630	7,994	415,512	29.5	10.64	22.93	31.36	12.83	5.14	3.74	3.37	4.69	1,530	3,313
1961	272,766	121,979	8,232	402,977	30.3	11.41	25.00	30.61	13.87	5.02	3.67	3.24	4.58	1,477	3,204

---

[1] Includes power strip pits proper and excludes horse stripping operations and mines combining stripping and underground in the same operation for the period 1914–42. The years 1943–61 include data on all strip mines.

[2] Data not available.

[3] Exclusive of horse stripping operations.

TABLE 29. Number and production of bituminous coal and lignite strip mines and units of stripping and loading equipment in use in the United States

Year	Number of strip mines	Production (thousand net tons)	Number of power shovels and dragline excavators											Total	Number of carry-all scrapers	Number of bull-dozers
			By type of power					By capacity of dipper or bucket, cubic yards				By type of machine				
			Electric	Diesel-electric	Diesel	Gasoline	Steam	Less than 3	3-5	6-12	More than 12	Power shovels	Dragline excavators			
1932	255	19,641	[1] 105	(2)	[3] 61	(4)	166	(5)	(5)	(5)	(5)	(5)	(5)	332	(5)	(5)
1933	289	18,270	[1] 117	(2)	[3] 103	(4)	169	(5)	(5)	(5)	(5)	(5)	(5)	389	(5)	(5)
1934	344	20,790	[1] 121	(2)	[3] 149	(4)	188	(5)	(5)	(5)	(5)	(5)	(5)	458	(5)	(5)
1935	368	23,647	[1] 139	(2)	[3] 194	(4)	174	(5)	(5)	(5)	(5)	(5)	(5)	507	(5)	(5)
1936	381	28,126	[1] 151	(2)	[3] 223	(4)	188	(5)	(5)	(5)	(5)	(5)	(5)	562	(5)	(5)
1937	449	31,751	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
1938	465	30,407	[1] 155	(2)	[3] 440	(4)	142	(5)	(5)	(5)	(5)	(5)	(5)	737	(5)	(5)
1939	537	37,722	[1] 184	(2)	[3] 524	(4)	206	(5)	(5)	(5)	(5)	(5)	(5)	914	(5)	(5)
1940	638	43,167	[1] 194	(2)	[3] 697	(4)	180	(5)	(5)	(5)	(5)	(5)	(5)	1,071	(5)	(5)
1941	769	55,071	[1] 210	(2)	[3] 911	(4)	200	1,009	153	95	64	(5)	(5)	1,321	(5)	(5)
1942	834	67,203	[1] 219	(2)	[3] 1,020	(4)	199	1,114	159	97	68	(5)	(5)	1,438	(5)	(5)
1943	1,004	79,685	[1] 234	(2)	[3] 1,433	(4)	172	1,488	173	106	72	(5)	(5)	1,839	(5)	(5)
1944	1,240	100,898	[1] 244	(2)	[3] 1,902	(4)	166	1,900	225	113	74	(5)	(5)	2,312	(5)	(5)
1945	1,370	109,987	[1] 256	(2)	[3] 2,042	(4)	141	2,004	243	117	75	(5)	(5)	2,439	(5)	(5)
1946	1,445	112,964	[1] 261	(2)	1,619	753	111	2,256	302	112	74	2,406	338	2,744	263	(5)
1947	1,750	139,395	[1] 301	(2)	2,279	591	83	2,685	362	123	84	2,822	432	3,254	275	(5)
1948	1,971	139,506	[1] 337	(2)	2,675	646	54	3,048	446	130	88	3,177	535	3,712	362	(5)
1949	1,761	106,045	[1] 352	(2)	2,646	527	51	2,931	367	168	110	3,011	565	3,576	320	(5)
1950	1,870	123,467	[1] 348	(2)	2,880	607	42	3,182	416	170	109	3,247	630	3,877	286	(5)
1951	1,784	117,618	[1] 346	(2)	2,905	533	26	3,088	420	187	115	3,164	646	3,810	220	(5)
1952	1,643	108,910	[1] 321	(2)	2,642	545	19	2,800	425	183	119	2,892	635	3,527	218	(5)
1953	1,554	105,448	[1] 317	(2)	2,629	446	17	2,692	413	193	111	2,793	616	3,409	244	1,954
1954	1,329	98,134	[1] 381	(2)	2,617	374	18	2,480	579	211	120	2,605	785	3,390	269	2,599
1955	1,617	115,093	[1] 315	(2)	2,603	337	10	2,381	550	223	111	2,592	673	3,265	187	2,106
1956	1,728	127,055	285	136	2,914	365	5	2,693	634	249	129	2,899	806	3,705	226	2,381
1957	1,756	124,109	325	164	2,839	389	6	2,748	566	266	143	2,894	829	3,723	215	2,499
1958	1,646	116,242	315	273	2,607	315	5	2,507	591	275	142	2,704	811	3,515	173	2,472
1959	1,594	120,953	309	215	2,579	307	7	2,435	572	267	143	2,607	810	3,417	161	2,443
1960	1,530	122,630	311	194	2,519	285	4	2,315	488	265	145	2,521	792	3,313	163	2,345
1961	1,477	121,979	286	210	2,455	253	(6)	2,162	606	299	137	2,412	792	3,204	152	2,341

[1] Includes diesel-electric shovels.

[2] Included with electric shovels.

[3] Includes gasoline shovels.

[4] Included with diesel shovels.

[5] Data not available.

[6] Canvass discontinued.

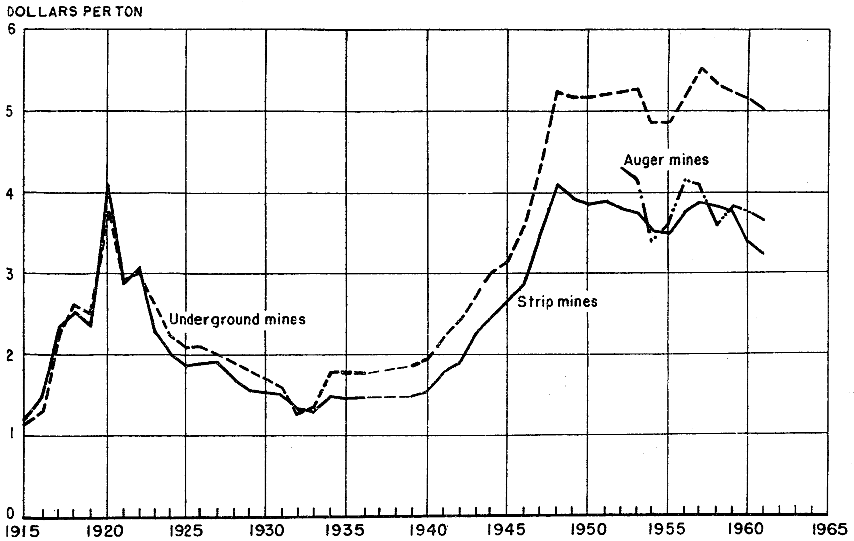

FIGURE 10.—Average value per ton, f.o.b. mines, of bituminous coal and lignite produced in the United States, 1915–61, by underground, strip, and auger mines.

TABLE 30.—Number and production of bituminous coal and lignite strip mines and units of stripping and loading equipment in use in the United States, 1961, by States

State	Number of strip mines	Production (net tons)	Number of power shovels and dragline excavators											Number of carryall scrapers	Number of bull-dozers
			By type of power				By capacity of dipper or bucket, cubic yards				By type of machine		Total		
			Electric	Diesel electric	Diesel	Gas	Less than 3	3-5	6-12	More than 12	Power shovels	Dragline excavators			
Alabama	44	2,701,052	12	9	75	2	52	26	14	6	77	21	98	7	63
Alaska	4	627,537	---	---	14	---	10	3	1	---	12	2	14	2	19
Arkansas	10	230,341	---	3	7	---	5	3	2	---	3	7	10	2	11
Colorado	6	521,368	2	2	6	---	5	4	1	---	5	5	10	2	14
Illinois	61	22,785,504	91	9	50	5	27	32	49	47	103	52	155	1	126
Indiana	40	10,497,306	41	13	38	10	32	33	20	17	60	42	102	5	91
Iowa	26	779,600	4	2	40	14	42	15	2	1	33	27	60	3	43
Kansas	9	661,876	6	3	5	1	8	2	2	3	9	6	15	1	9
Kentucky:															
Eastern	68	2,555,149	2	7	85	2	74	21	1	---	91	5	96	---	51
Western	43	18,898,542	34	7	74	6	40	40	26	15	89	32	121	2	102
Total Kentucky	111	21,453,691	36	14	159	8	114	61	27	15	180	37	217	2	153
Maryland	33	470,263	---	2	31	13	42	3	1	---	39	7	46	---	41
Missouri	19	2,867,037	11	3	20	10	25	8	4	7	26	18	44	1	44
Montana:															
Bituminous	2	7,660	---	---	1	---	1	---	---	---	1	---	1	1	1
Lignite	2	263,348	1	---	1	1	1	1	1	---	2	1	3	1	2
Total Montana	4	271,008	1	---	2	1	2	1	1	---	3	1	4	2	3
New Mexico	1	15,248	---	---	---	1	1	---	---	---	1	---	1	1	1
North Dakota (lignite)	31	2,724,289	19	7	16	9	29	11	10	1	40	11	51	26	37
Ohio	260	22,463,370	40	51	419	68	378	120	58	22	433	145	578	52	512
Oklahoma	17	882,844	5	5	12	1	10	4	5	4	12	11	23	---	20
Pennsylvania	535	20,744,848	13	52	1,163	89	980	232	92	13	941	376	1,317	13	794
South Dakota (lignite)	1	17,805	---	1	1	---	1	1	---	---	1	1	2	1	1
Tennessee	65	1,761,170	---	4	104	5	101	9	3	---	109	4	113	---	47
Virginia	36	1,412,341	---	8	55	1	62	2	---	---	64	---	64	---	52
Washington	1	6,382	---	---	---	---	---	---	---	---	---	---	---	---	2
West Virginia	154	5,860,083	---	21	231	12	226	32	5	1	250	14	264	10	233
Wyoming	9	2,224,121	5	1	7	3	10	4	2	---	11	5	16	21	25
Total	1,477	121,979,084	286	210	2,455	253	2,162	606	299	137	2,412	792	3,204	152	2,341

TABLE 31.—Bituminous coal and lignite strip mines using power drills in bank or overburden in the United States

Year	Number of mines	Production		Number of power drills		
		Quantity (net tons)	Percentage of total	Horizontal	Vertical	Total
1946	514	75,375,841	66.7	(1)	(1)	764
1947	598	95,915,346	68.8	(1)	(1)	875
1948	728	98,809,393	72.3	(1)	(1)	1,195
1949	756	78,146,655	73.7	(1)	(1)	1,256
1950	692	87,205,280	70.6	(1)	(1)	1,201
1951	650	85,331,204	72.5	737	388	1,125
1952	629	79,252,284	73.0	685	385	1,070
1953	603	80,259,365	76.1	639	409	1,048
1954	541	70,107,205	71.4	592	391	983
1955	564	85,623,050	74.4	582	371	953
1956	696	96,278,779	75.8	652	389	1,041
1957	722	96,418,089	77.7	640	464	1,104
1958	737	91,659,662	78.9	615	464	1,079
1959	697	95,716,153	79.1	580	487	1,067
1960	714	96,660,466	78.8	551	498	1,049
1961	650	92,136,140	75.5	495	449	944

[1] Data not available.

TABLE 32.—Bituminous coal and lignite strip mines using power drills in bank or overburden in the United States, by States

State	Number of mines		Production				Number of power drills					
			Quantity (net tons)		Percentage of total strip production		Horizontal		Vertical		Total	
	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961
Alabama	24	26	1,673,163	1,789,289	65.4	66.2	15	12	22	23	37	35
Alaska	6	4	655,489	627,737	100.0	100.0	4	2	11	10	15	12
Arkansas	7	7	293,983	222,173	99.2	96.5	5	6	3	2	8	8
Colorado	6	4	667,265	487,745	96.3	93.6	5	3	5	5	10	8
Illinois	41	42	18,278,805	19,367,844	80.6	85.0	29	29	37	38	66	67
Indiana	34	30	10,644,581	10,375,741	98.7	98.8	27	21	22	18	49	39
Iowa	20	26	846,346	779,600	97.5	100.0	22	25	11	13	33	38
Kansas	7	6	861,688	654,455	97.4	98.9	10	8	1	1	11	9
Kentucky:												
Eastern	25	19	1,183,033	1,048,468	59.6	41.0	23	16	6	8	29	24
Western	39	27	16,268,520	17,422,158	92.0	92.2	26	18	42	34	68	52
Total Kentucky	64	46	17,451,553	18,470,626	88.7	86.1	49	34	48	42	97	76
Maryland	4	6	96,589	47,350	19.8	10.1	1	1	2	2	3	3
Missouri	13	13	2,664,177	2,247,324	95.1	78.4	17	18	3	3	20	21
Montana:												
Bituminous	2	2	8,031	7,660	100.0	100.0	1	1	1	1	2	2
Lignite	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------
Total Montana	2	2	8,031	7,660	100.0	100.0	1	1	1	1	2	2
New Mexico	1	1	45,000	15,248	100.0	100.0	--------	--------	1	1	1	1
North Dakota (lignite)	5	5	619,768	216,517	24.6	7.9	2	3	4	4	6	7
Ohio	118	114	18,564,902	16,712,213	77.7	74.4	77	81	102	91	179	172
Oklahoma	10	15	993,190	849,444	90.8	96.2	9	11	5	7	14	18
Pennsylvania	216	169	13,227,390	10,656,117	63.4	51.4	145	117	146	120	291	237
Tennessee	27	21	971,177	774,235	55.1	44.0	27	21	4	6	31	27
Virginia	13	15	949,835	1,039,182	69.3	73.6	13	15	6	4	19	19
Washington	1	1	16,177	6,382	100.0	100.0	--------	--------	1	1	1	1
West Virginia	88	89	5,455,240	4,579,747	80.8	78.2	86	78	58	53	144	131
Wyoming	7	8	1,676,117	2,209,511	97.8	99.3	7	9	5	4	12	13
Total	714	650	96,660,466	92,136,140	78.8	75.5	551	495	498	449	1,049	944

TABLE 33.—Method of haulage from bituminous coal and lignite strip mines to tipple or ramp, in the United States[1]

Year	Strip mines reporting method of haulage							Strip mines not reporting method of haulage—production (net tons)	Total strip production (net tons)
	Strip mines using trucks				Strip mines using rail, rail and truck, truck and tram—production (net tons)	Strip production			
	Production (net tons)	Number of trucks	Average capacity per truck (net tons)	Average distance hauled (miles)		Total (net tons)	Percentage of total		
1948	97, 450, 399	7, 214	9. 4	3. 7	6, 327, 989	103, 778. 388	74. 4	35, 727, 532	139, 505, 920
1949	73. 229, 556	6, 694	10. 1	3. 7	5, 365, 432	78, 594. 988	74. 1	27, 450, 311	106, 045, 299
1950	88, 666. 733	6, 564	10. 3	3. 8	4, 364, 333	93. 031. 066	75. 3	30, 435, 498	123, 466, 564
1951	87, 427, 029	6, 173	10. 6	4. 0	2, 424, 994	89, 852. 023	76. 4	27, 765, 653	117, 617, 676
1952	88, 589. 637	5, 799	11. 3	4. 0	2, 296, 744	90. 886, 381	83. 5	18, 023. 375	108, 909, 756
1953	84, 764, 694	5, 287	12. 2	4. 0	2, 104, 609	86, 869, 303	82. 4	18, 579, 266	105, 448, 569
1954	73, 794, 489	4, 250	13. 2	3. 9	1, 203, 753	74, 998. 242	76. 4	23, 136, 008	98. 134, 250
1955	94, 150, 171	4, 798	13. 3	3. 9	2, 290, 600	96, 440, 771	83. 9	18, 651, 998	115. 092, 769
1956	103, 127, 374	5, 432	13. 3	4. 4	1, 056. 627	104. 184, 001	82. 0	22, 871, 381	127, 055, 382
1957	104, 796, 728	5, 532	14. 0	4. 3	164, 311	104, 961. 039	84. 6	19, 147, 499	124. 108, 538
1958	99, 223. 676	5, 151	14. 5	4. 4	19, 241	99, 242, 917	85. 4	16, 998, 870	116, 241, 787
1959	102, 706, 819	4, 959	15. 3	4. 6	-------------	102, 706, 819	84. 9	18, 246, 515	120, 953, 334
1960	104, 099, 974	4, 855	15. 5	4 8	-------------	104, 099. 974	84. 9	18, 529, 690	122, 629, 664
1961	101, 951, 989	4, 407	16. 5	4. 4	-------------	101, 951, 989	83. 6	20, 027, 095	121, 979, 084

[1] Excludes lignite in 1948 and 1949.

TABLE 34.—Method of haulage from bituminous coal and lignite strip mines to tipple or ramp, in the United States, 1961, by States

State	Strip mines reporting method of haulage					Strip mines not reporting method of haulage—production (net tons)	Total strip production (net tons)
	Number of trucks	Average capacity per truck (net tons)	Average distance hauled (miles)	Production			
				Net tons	Percentage of total production		
Alabama	111	17.5	3.4	1,882,242	69.7	818,810	2,701,052
Alaska	30	20.4	2.6	627,537	100.0		627,537
Arkansas	22	7.1	1.8	211,945	92.0	18,396	230,341
Colorado	17	20.1	3.3	487,745	93.6	33,623	521,368
Illinois	354	28.8	3.4	22,751,750	99.9	33,754	22,785,504
Indiana	155	32.4	3.7	10,326,317	98.4	170,989	10,497,306
Iowa	63	10.9	3.7	744,813	95.5	34,787	779,600
Kansas	19	27.1	2.7	655,312	99.0	6,564	661,876
Kentucky	419	18.5	3.2	18,815,961	87.7	2,637,730	21,453,691
Maryland	48	15.8	8.7	274,548	58.4	195,715	470,263
Missouri	72	20.9	3.5	2,267,999	79.1	599,038	2,867,037
Montana:							
Bituminous	2	7.5	.3	7,660	100.0		7,660
Lignite	5	13.6	1.0	263,348	100.0		263,348
Total Montana	7	11.9	1.0	271,008	100.0		271,008
New Mexico	3	8.0	1.0	15,248	100.0		15,248
North Dakota (lignite)	86	13.8	2.7	2,671,380	98.1	52,909	2,724,289
Ohio	721	16.5	6.4	16,711,086	74.4	5,752,284	22,463,370
Oklahoma	120	9.9	6.9	835,392	94.6	47,452	882,844
Pennsylvania	1,481	12.6	5.5	15,220,619	73.4	5,524,229	20,744,848
South Dakota (lignite)	3	6.0	.5	17,805	100.0		17,805
Tennessee	133	13.0	6.9	716,448	40.7	1,044,722	1,761,170
Virginia	70	12.0	6.9	987,731	69.9	424,610	1,412,341
Washington	2	10.0	1.0	6,382	100.0		6,382
West Virginia	454	15.1	7.6	4,288,720	73.2	1,571,363	5,860,083
Wyoming	17	30.0	.7	1,164,001	52.3	1,060,120	2,224,121
Total	4,407	16.5	4.4	101,951,989	83.6	20,027,095	121,979,084

TABLE 35.—Stripping operations in the bituminous coal and lignite fields of the United States, 1961, by States and counties

State and county	Number of strip mines	Production (net tons)	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day
Alabama:						
Bibb	1	17,839	12	100	1,189	15.00
Blount	4	157,771	76	284	21,465	7.35
Cullman	3	22,809	17	90	1,533	14.88
Jackson	(1)	(1)	(1)	(1)	(1)	(1)
Jefferson	7	299,118	95	228	21,566	13.87
Marion	1	25,200	17	100	1,680	15.00
Tuscaloosa	8	721,537	187	192	35,915	20.09
Walker	17	1,343,210	313	185	57,847	23.22
Winston	(1)	(1)	(1)	(1)	(1)	(1)
Other counties	3	113,568	45	152	6,837	16.61
Total Alabama	44	2,701,052	762	194	148,032	18.25
Alaska	4	627,537	162	287	46,519	13.49

---

[1] Included in "Other counties" to avoid disclosing individual operations.

TABLE 35.—Stripping operations in the bituminous coal and lignite fields of the United States, 1961, by States and counties—Continued

State and county	Number of strip mines	Production (net tons)	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day
Arkansas:						
Franklin	1	99,386	19	236	4,475	22.21
Johnson	4	41,791	24	171	4,050	10.32
Logan	(1)	(1)	(1)	(1)	(1)	(1)
Pope	(1)	(1)	(1)	(1)	(1)	(1)
Sebastian	3	31,710	30	153	4,629	6.85
Other counties	2	57,454	24	254	6.089	9.44
Total Arkansas	10	230,341	97	198	19.243	11.97
Colorado:						
El Paso	(1)	(1)	(1)	(1)	(1)	(1)
Fremont	2	33,623	15	65	963	34.91
Montrose	(1)	(1)	(1)	(1)	(1)	(1)
Routt	2	394,627	73	209	15,242	25.89
Other counties	2	93,118	17	203	3,450	26.99
Total Colorado	6	521,368	105	187	19,655	26.53
Illinois:						
Adams	1	35,866	16	149	2,385	15.04
Brown	1	1,730	3	232	695	2.49
Bureau	(1)	(1)	(1)	(1)	(1)	(1)
Fulton	13	4,955,330	760	243	184,625	26.84
Gallatin	1	74,149	9	138	1,242	59.70
Greene	1	6,424	2	240	480	13.38
Grundy	(1)	(1)	(1)	(1)	(1)	(1)
Jackson	(1)	(1)	(1)	(1)	(1)	(1)
Jefferson	1	15,433	10	220	2,195	7.03
Kankakee	(1)	(1)	(1)	(1)	(1)	(1)
Knox	(1)	(1)	(1)	(1)	(1)	(1)
Mercer	1	3,026	2	180	360	8.41
Peoria	6	845.472	92	240	21,989	38.45
Perry	(1)	(1)	(1)	(1)	(1)	(1)
Randolph	2	945,687	101	292	29,488	32.07
St. Clair	3	3,491,543	258	295	76,068	45.90
Saline	7	1,832,233	345	228	78,772	23.26
Schuyler	(1)	(1)	(1)	(1)	(1)	(1)
Stark	(1)	(1)	(1)	(1)	(1)	(1)
Vermilion	(1)	(1)	(1)	(1)	(1)	(1)
Wabash	1	1,894	3	124	372	5.09
Will	(1)	(1)	(1)	(1)	(1)	(1)
Williamson	6	2.098.886	292	246	71.855	29.21
Other counties	17	8.477.831	1,071	258	276,391	30.67
Total Illinois	61	22,785,504	2,964	252	746,917	30.51
Indiana:						
Clay	7	769,649	166	240	39,775	19.35
Daviess	1	44,661	16	185	2,960	15.09
Dubois	1	2,895	4	30	120	24.13
Fountain	1	4,050	1	300	300	13.50
Greene	5	1.326,533	212	232	49,076	27.03
Knox	1	278,358	82	165	13,519	20.59
Owen	(1)	(1)	(1)	(1)	(1)	(1)
Parke	(1)	(1)	(1)	(1)	(1)	(1)
Pike	4	2,044,142	329	261	85,816	23.82
Spencer	(1)	(1)	(1)	(1)	(1)	(1)
Sullivan	2	60,492	46	67	3,063	19.75
Vermillion	1	1.400	2	20	40	35.00
Vigo	1	460.806	80	215	17,143	26.88
Warrick	9	5.048.579	370	266	98,298	51.36
Other counties	7	455,741	107	192	20,580	22.14
Total Indiana	40	10,497,306	1.415	234	330,690	31.74
Iowa:						
Lucas	1	4,287	2	185	370	11.59
Mahaska	8	228,427	59	286	16,895	13.52
Marion	10	450,135	98	189	18,486	24.35
Monroe	2	25,331	9	119	1,046	24.21
Van Buren	1	11.584	10	180	1,799	6.44
Wapello	4	59,836	20	223	4,455	13.43
Total Iowa	26	779.600	198	217	43,051	18.11

[1] Included in "Other counties" to avoid disclosing individual operations.

TABLE 35.—Stripping operations in the bituminous coal and lignite fields of the United States, 1961, by States and counties—Continued

State and county	Number of strip mines	Production (net tons)	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day
Kansas:						
Bourbon	1	2,050	2	98	196	10.46
Cherokee	(1)	(1)	(1)	(1)	(1)	(1)
Coffey	1	1,474	2	150	300	4.91
Crawford	(1)	(1)	(1)	(1)	(1)	(1)
Osage	1	1,500	2	122	272	5.51
Other counties	6	656,852	159	266	42,297	15.53
Total Kansas	9	661,876	165	261	43,065	15.37
Kentucky, Eastern:						
Bell	12	636,460	113	239	27,095	23.49
Boyd	3	55.329	37	100	3,689	15.00
Breathitt	1	6,000	6	100	600	10.00
Carter	1	4,360	4	100	436	10.00
Clay	5	107,427	46	171	7,893	13.61
Harlan	6	158,694	180	205	36,906	4.30
Jackson	3	21,958	22	100	2,196	10.00
Knott	5	492,695	94	150	14,077	35.00
Knox	2	72,353	29	100	2,894	25.00
Laurel	1	3,500	3	32	96	36.46
Lawrence	2	4.450	9	50	445	10.00
Leslie	1	13.226	13	50	661	20.00
Letcher	2	284,348	70	190	13,269	21.43
McCreary	1	136,051	27	100	2,721	50.00
Morgan	2	41,300	7	153	1,057	39.06
Owsley	1	100.000	20	200	4,000	25.00
Perry	4	110,428	9	95	840	131.53
Pike	3	43,600	29	38	1.088	40.09
Pulaski	2	78,614	9	268	2,410	32.62
Rockcastle	1	8,427	128	60	7,661	1.10
Whitley	10	175,929	40	182	7,258	24.24
Total Eastern Kentucky	68	2,555,149	895	153	137.292	18.61
Kentucky, Western:						
Butler	7	210.949	53	112	5,902	35.74
Christian	1	85.605	16	242	3.875	22.09
Daviess	2	967,761	78	303	23,633	40.95
Grayson	1	2.240	4	50	224	10.00
Hopkins	12	3,972,116	380	245	93,002	42.71
McLean	1	77,991	11	204	2,223	35.09
Muhlenberg	10	9,775,168	690	287	197.958	49.38
Ohio	5	2,752.561	171	322	54,941	50.10
Webster	4	1,054,151	207	216	44,800	23.53
Total Western Kentucky	43	18,898,542	1,610	265	426,558	44.30
Total Kentucky	111	21,453,691	2,505	225	563,850	38.05
Maryland:						
Allegany	17	113.650	50	208	10.465	10.86
Garrett	16	356.613	84	198	16.625	21.45
Total Maryland	33	470,263	134	202	27.090	16.17
Missouri:						
Barton	(1)	(1)	(1)	(1)	(1)	(1)
Callaway	(1)	(1)	(1)	(1)	(1)	(1)
Clark	1	9,785	8	164	1.313	7.45
Dade	1	13,000	9	285	2,457	5.29
Henry	(1)	(1)	(1)	(1)	(1)	(1)
Macon	(1)	(1)	(1)	(1)	(1)	(1)
Putnam	(1)	(1)	(1)	(1)	(1)	(1)
Ralls	1	2,960	4	107	446	6.63
Randolph	(1)	(1)	(1)	(1)	(1)	(1)
St. Clair	(1)	(1)	(1)	(1)	(1)	(1)
Vernon	(1)	(1)	(1)	(1)	(1)	(1)
Other counties	16	2,841,292	1,899	117	222,943	12.74
Total Missouri	19	2.867,037	1,920	118	227,159	12.62

[1] Included in "Other counties" to avoid disclosing individual operations.

TABLE 35.—Stripping operations in the bituminous coal and lignite fields of the United States, 1961, by States and counties—Continued

State and county	Number of strip mines	Production (net tons)	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day
Montana (bituminous):						
Carbon	(1)	(1)	(1)	(1)	(1)	(1)
Rosebud	(1)	(1)	(1)	(1)	(1)	(1)
Other counties	2	7.660	10	174	1,736	4.41
Total Montana (bituminous)	2	7.660	10	174	1,736	4.41
Montana (lignite):						
Richland	(1)	(1)	(1)	(1)	(1)	(1)
Sheridan	(1)	(1)	(1)	(1)	(1)	(1)
Other counties	2	263,348	16	225	3 595	73.25
Total Montana (lignite)	2	263,348	16	225	3,595	73.25
Total Montana	4	271.008	26	205	5,331	50.84
New Mexico: McKinley	1	15,248	15	102	1,525	10.00
North Dakota (lignite):						
Adams	1	17,849	6	167	1,002	17.81
Bowman	1	172,058	17	184	3,132	54.94
Burke	2	410.858	48	222	10.655	38.56
Burleigh	1	13.084	3	206	618	21.17
Divide	1	214,659	45	212	9,592	22.38
Dunn	1	6,148	5	168	760	8.09
Grant	4	21,964	7	174	1,218	18.03
Hettinger	1	3,100	6	60	332	9.35
McLean	3	82,597	22	163	3,559	23.21
Mercer	4	1,053,013	97	203	19,786	53.22
Morton	4	18,888	12	160	1,898	9.95
Oliver	2	8,728	4	120	495	17.62
Stark	3	102.278	10	193	1,925	53.13
Ward	3	599,065	46	260	11,950	50.13
Total North Dakota (lignite)	31	2,724,289	328	204	66,922	40.71
Ohio:						
Athens	(1)	(1)	(1)	(1)	(1)	(1)
Belmont	19	1,474,660	385	157	60.511	24.37
Carroll	13	382,155	81	287	23,147	16.51
Columbiana	32	1,171,416	267	249	66,407	17.64
Coshocton	10	1,727.304	332	293	97,368	17.74
Gallia	7	566,528	130	235	30,656	18.48
Guernsey	6	146,708	52	151	7,812	18.78
Harrison	(1)	(1)	(1)	(1)	(1)	(1)
Hocking	4	38,557	17	142	2,405	16.03
Holmes	5	165,864	34	235	7,928	20.92
Jackson	10	252,586	127	146	18,518	13.64
Jefferson	28	2,050,797	395	258	101,827	20.14
Lawrence	(1)	(1)	(1)	(1)	(1)	(1)
Mahoning	20	1,031,267	231	246	56,913	18.12
Meigs	5	114,717	21	246	5,219	21.98
Morgan	3	2,273.323	258	246	63,501	35.80
Muskingum	5	36.964	9	185	1,628	22.71
Noble	11	1,353,253	138	235	32,413	41.75
Perry	(1)	(1)	(1)	(1)	(1)	(1)
Portage	1	97,622	23	317	7,291	13.39
Stark	15	764,389	162	292	47,185	16.20
Tuscarawas	29	1,619,824	382	269	102.716	15.77
Vinton	5	108,267	51	224	11,469	9.44
Washington	(1)	(1)	(1)	(1)	(1)	(1)
Wayne	2	75,471	32	148	4,717	16.00
Other counties	30	7.011,698	743	236	175.680	39.91
Total Ohio	260	22,463,370	3.870	239	925.311	24.28

[1] Included in "Other counties" to avoid disclosing individual operations.

TABLE 35.—Stripping operations in the bituminous coal and lignite fields of the United States, 1961, by States and counties—Continued

State and county	Number of strip mines	Production (net tons)	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day
Oklahoma:						
Craig	5	132,107	69	221	15,237	8.67
Haskell	5	365,342	99	202	19,997	18.27
McIntosh	(1)	(1)	(1)	(1)	(1)	(1)
Muskogee	2	4,050	5	66	312	12.98
Nowata	1	5,021	4	87	348	14.43
Rogers	(1)	(1)	(1)	(1)	(1)	(1)
Sequoyah	1	82,071	25	205	5,120	16.03
Other counties	3	294,253	126	181	22,851	12.88
Total Oklahoma	17	882,844	328	195	63,865	13.82
Pennsylvania:						
Allegheny	23	483,848	154	175	27,031	17.90
Armstrong	46	1,418,745	388	170	65,896	21.53
Beaver	13	427,478	136	232	31,455	13.59
Bedford	(1)	(1)	(1)	(1)	(1)	(1)
Blair	1	45,217	26	284	7,388	6.12
Bradford	(1)	(1)	(1)	(1)	(1)	(1)
Butler	41	1,779,966	367	230	84,479	21.07
Cambria	21	436,379	271	153	41,402	10.54
Cameron	1	58,170	22	264	5,817	10.00
Centre	14	768,570	220	261	57,485	13.37
Clarion	30	2,940,570	636	252	160,249	18.35
Clearfield	101	5,298,289	1,411	218	307,682	17.22
Clinton	5	400,704	100	220	22,102	18.13
Elk	8	247,819	66	201	13,267	18.68
Fayette	21	321,819	126	149	18,842	17.08
Greene	4	25,997	19	120	2,253	11.54
Huntingdon	5	22,015	16	133	2,105	10.46
Indiana	29	561,345	225	179	40,298	13.93
Jefferson	29	977,957	313	196	61,352	15.94
Lawrence	17	590,018	185	214	39,652	14.88
Lycoming	3	52,351	17	203	3,456	15.15
McKean	(1)	(1)	(1)	(1)	(1)	(1)
Mercer	11	914,967	150	294	44,010	20.79
Somerset	47	1,061,278	299	187	55,916	18.98
Tioga	6	265,009	53	229	12,229	21.67
Venango	(1)	(1)	(1)	(1)	(1)	(1)
Washington	24	930,945	281	190	53,472	17.41
Westmoreland	25	175,768	101	131	13,276	13.24
Other counties	10	539,624	107	213	22,839	23.63
Total Pennsylvania	535	20,744,848	5,689	210	1,193,953	17.37
South Dakota (lignite): Dewey	1	17,805	8	186	1,487	11.97
Tennessee:						
Anderson	9	285,162	52	171	8,920	31.97
Bledsoe	1	3,780	4	90	360	10.50
Campbell	16	622,610	121	196	23,755	26.21
Claiborne	6	180,478	27	158	4,228	42.69
Cumberland	1	6,248	4	100	398	15.71
Fentress	1	5,000	5	100	500	10.00
Grundy	4	174,255	41	228	9,389	18.56
Hamilton	(1)	(1)	(1)	(1)	(1)	(1)
Marion	(1)	(1)	(1)	(1)	(1)	(1)
Morgan	8	88,740	42	107	4,537	19.56
Scott	10	248,494	69	128	8,818	28.18
Sequatchie	(1)	(1)	(1)	(1)	(1)	(1)
Van Buren	5	113,126	36	111	3,954	28.61
Other counties	4	33,277	26	58	1,508	22.07
Total Tennessee	65	1,761,170	427	155	66,367	26.54

[1] Included in "Other counties" to avoid disclosing individual operations.

TABLE 35.—Stripping operations in the bituminous coal and lignite fields of the United States, 1961, by States and counties—Continued

State and county	Number of strip mines	Production (net tons)	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day
Virginia:						
Dickenson	6	152,668	31	200	6,107	25.00
Lee	3	38,900	16	115	1,793	21.70
Russell	(1)	(1)	(1)	(1)	(1)	(1)
Tazewell	(1)	(1)	(1)	(1)	(1)	(1)
Wise	22	1,102,873	138	235	32,524	33.91
Other counties	5	117,900	16	240	3,840	30.70
Total Virginia	36	1,412,341	201	220	44,264	31.91
Washington: Kittitas	1	6,382	11	206	2,271	2.81
West Virginia:						
Barbour	14	714,681	192	124	23,751	30.09
Boone	(1)	(1)	(1)	(1)	(1)	(1)
Braxton	1	1,076	2	100	200	5.38
Brooke	6	193,103	64	195	12,450	15.51
Fayette	(1)	(1)	(1)	(1)	(1)	(1)
Gilmer	1	37,933	10	45	450	84.30
Grant	(1)	(1)	(1)	(1)	(1)	(1)
Greenbrier	5	232,308	104	106	10,999	21.12
Harrison	30	1,176,388	255	162	41,349	28.45
Kanawha	(1)	(1)	(1)	(1)	(1)	(1)
Lewis	3	410,526	103	211	21,698	18.92
Lincoln	4	33,250	16	93	1,482	22.44
Marion	(1)	(1)	(1)	(1)	(1)	(1)
Mason	1	90,541	17	255	4,334	20.89
McDowell	(1)	(1)	(1)	(1)	(1)	(1)
Mercer	3	51,553	30	93	2,790	18.48
Mineral	1	1,320	1	61	61	21.64
Monongalia	5	38,064	20	57	1,142	33.33
Nicholas	3	73,468	10	247	2,355	31.19
Pocahontas	1	17,396	12	100	1,160	15.00
Preston	30	854,235	144	260	37,319	22.89
Putnam	(1)	(1)	(1)	(1)	(1)	(1)
Raleigh	(1)	(1)	(1)	(1)	(1)	(1)
Randolph	7	172,939	49	199	9,765	17.71
Taylor	(1)	(1)	(1)	(1)	(1)	(1)
Tucker	(1)	(1)	(1)	(1)	(1)	(1)
Upshur	4	85,502	39	122	4,774	17.91
Webster	1	16,017	15	222	3,386	4.73
Wyoming	(1)	(1)	(1)	(1)	(1)	(1)
Other counties	34	1,659,783	415	172	71,408	23.24
Total West Virginia	154	5,860,083	1,498	167	250,873	23.36
Wyoming:						
Campbell	1	447,447	33	259	8,562	52.26
Carbon	3	377,351	56	219	12,296	30.69
Converse	2	826,422	17	311	5,314	155.52
Lincoln	1	224,073	39	162	6,305	35.54
Sheridan	2	348,828	38	243	9,248	37.72
Total Wyoming	9	2,224,121	183	228	41,725	53.30
Total United States	1,477	121,979,084	23,011	212	4,879,165	25.00

---

[1] Included in "Other counties" to avoid disclosing individual operations.

AUGER MINING

Augers are generally used in areas where strip mining has become economically impracticable because the overburden is thick. They were used first about 1945, and separate statistics on coal-recovery augers begin with 1951. The rapidly expanded production of coal by stripping during World War II in the mountainous areas of the northern Appalachian region left many miles of high wall containing exposed coal seams. After several years of experimentation, large, efficient augers as much as 84 inches in diameter were developed to recover the coal from these exposed coal seams.

Production at auger mines increased rapidly from 205,000 tons in 1951 to 8 million tons in 1961. Augers were used to mine coal in eight States in 1961, and sales of augers reported by three manufacturers indicate continued growth of auger mining. A few coal-recovery augers have been sold for underground use; these units and the coal produced by them have been included with coal loaded mechanically underground.

TABLE 36.—Auger mines in the bituminous coal and lignite fields of the United States, 1961, by States and counties

State and county	Number of auger mines	Equipment in use (number of units)[1]				Mined by augers (net tons)	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day
		Augers	Power shovels	Power drills	Bulldozers					
Alabama:										
Tuscaloosa	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Walker	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Other countries	4	4	------	------	------	137,989	28	191	5,346	25.81
Total Alabama	4	4	------	------	------	137,989	28	191	5,346	25.81
Illinois: Pope	1	1	------	------	2	42,511	12	104	1,244	34.17
Kentucky, Eastern:										
Bell	13	14	9	2	14	364,557	184	61	11,203	32.54
Breathitt	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Clay	3	3	------	------	1	80,212	27	150	4,011	20.00
Floyd	6	7	------	------	1	122,029	35	100	3,487	35.00
Harlan	7	7	1	1	12	293,435	116	179	20,796	14.11
Knott	8	8	------	------	2	163,935	259	23	5,968	27.47
Knox	2	2	------	------	2	76,164	25	100	2,539	30.00
Leslie	2	2	------	------	2	52,107	12	118	1,391	37.47
Letcher	4	3	------	------	3	204.204	125	107	13,373	15.27
Perry	22	21	4	1	16	449,735	145	117	16,984	26.48
Pike	28	29	2	1	17	618,162	164	97	15,863	38.97
Whitley	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Other counties	4	5	3	1	4	187,873	43	241	10,344	18.16
Total Eastern Kentucky	99	101	19	6	74	2,612,413	1,135	93	105,959	24.65
Kentucky, Western:										
Hopkins	1	1	------	------	2	8,285	10	45	450	18.41
Ohio	1	1	2	------	2	116,032	11	225	2,475	46.88
Webster	2	2	------	------	3	19,447	17	25	425	45.71
Total Western Kentucky	4	4	2	------	7	143,764	38	88	3,350	42.91
Total Kentucky	103	105	21	6	81	2,756,177	1,173	93	109,309	25.21

[1] Included in "Other counties" to avoid disclosing individual operations.

TABLE 36.—Auger mines in the bituminous coal and lignite fields of the United States, 1961, by States and counties—Continued

State and county	Number of auger mines	Equipment in use (number of units) [1]				Mined by augers (net tons)	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day
		Augers	Power shovels	Power drills	Bulldozers					
Ohio:										
Athens	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Belmont	5	5	------	------	2	61,489	10	107	1,061	57.93
Carroll	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Columbiana	6	6	------	------	3	46,091	8	116	951	48.47
Coshocton	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Gallia	3	3	------	------	3	82,672	15	127	1,875	44.10
Guernsey	1	------	------	------	------	23,763	2	125	223	106.53
Harrison	4	5	------	------	8	121,177	38	54	2,076	58.38
Hocking	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Holmes	1	1	------	------	1	3,003	1	100	100	30.00
Jefferson	8	8	------	------	6	376,077	38	133	5,075	74.10
Lawrence	1	1	------	------	1	8,580	3	100	286	30.00
Meigs	3	2	------	------	2	70,461	8	275	2,273	31.00
Morgan	1	1	------	------	------	26,743	4	90	360	74.29
Noble	3	3	------	------	2	26,421	22	69	1,487	17.77
Perry	2	2	------	------	3	45,381	6	132	835	54.32
Tuscarawas	6	5	------	------	3	90,585	14	176	2,398	37.78
Washington	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Other counties	9	9	1	------	6	269,173	57	121	6,941	38.78
Total Ohio	53	51	1	------	40	1,251,616	226	115	25,941	48.25
Pennsylvania:										
Armstrong	11	10	------	------	2	102,047	48	77	3,701	27.57
Beaver	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Butler	6	6	------	------	------	42,947	15	137	2,008	21.39
Cambria	1	1	------	------	1	2,415	5	28	152	15.87
Clarion	1	1	------	------	1	5.370	3	112	336	15.98
Clearfield	11	14	------	5	5	121,954	36	182	6,564	18.58
Elk	1	3	------	------	------	9,600	2	160	320	30.00
Fayette	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Indiana	4	4	------	------	2	24,592	20	33	654	37.58
Jefferson	5	6	------	2	2	43.039	18	166	3.020	14.25
Lawrence	3	3	------	------	1	34,156	9	207	1,862	18.34
Washington	3	3	1	------	2	43,759	11	155	1,705	25.67
Westmoreland	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Other counties	4	4	------	2	2	34,721	13	105	1,367	25.40
Total Pennsylvania	50	55	1	9	18	464,600	180	120	21,689	21.42
Tennessee:										
Anderson	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Campbell	4	4	3	1	6	126,890	54	150	8,134	15.60
Claiborne	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Marion	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Scott	3	4	2	1	2	42,228	21	100	2,111	20.00
Other countries	5	5	1	------	2	94,420	20	106	2,111	44.73
Total Tennessee	12	13	6	2	10	263,538	95	130	12,356	21.33
Virginia:										
Buchanan	11	11	------	2	10	138,717	43	105	4,499	30.83
Dickenson	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Lee	3	3	------	------	3	59,713	8	132	1,049	56.91
Russell	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Tazewell	6	7	1	------	6	120,524	19	151	2,829	42.60
Wise	9	9	------	2	9	309,401	36	213	7,766	39.84
Other countries	5	6	------	------	3	81,753	15	126	1,897	43.10
Total Virginia	34	36	1	4	31	710,108	121	149	18,040	39.36

Included in "Other counties" to avoid disclosing individual operations.

TABLE 36.—Auger mines in the bituminous coal and lignite fields of the United States, 1961, by States and counties—Continued

State and county	Number of auger mines	Equipment in use (number of units)[1]				Mined by augers (net tons)	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day
		Augers	Power shovels	Power drills	Bulldozers					
West Virginia:										
Barbour	2	2	------	------	1	90,675	5	149	762	119.04
Boone	5	7	6	2	8	175,097	64	151	9,615	18.21
Brooke	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Clay	1	1	1	------	2	90,632	20	258	5,161	17.56
Fayette	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Gilmer	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Harrison	13	8	------	------	4	230,897	50	131	6,554	35.23
Kanawha	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Lewis	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Logan	4	5	------	------	8	202,428	37	165	6,050	33.46
Mason	1	1	------	------	------	8,404	2	144	288	29.18
McDowell	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Mercer	1	1	------	------	------	3,479	2	100	232	15.00
Mineral	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Mingo	4	2	2	------	1	79,387	8	193	1,545	51.38
Monongalia	1	1	------	------	------	31,704	4	101	404	78.48
Nicholas	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Pocahontas	1	1	------	------	1	5,403	3	174	523	10.33
Preston	2	2	------	------	2	54,582	5	205	1,024	53.30
Putnam	1	1	------	------	------	2,000	4	15	60	33.33
Raleigh	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Wyoming	2	2	------	------	------	14,481	8	96	731	19.82
Other countries	33	44	5	3	37	1,616,025	271	155	42,024	38.45
Total West Virginia	71	78	14	5	64	2,605,194	483	155	74,973	34.75
Total United States	328	343	44	26	246	8,231,733	2,318	116	268,898	30.61

[1] Included in "Other counties" to avoid disclosing individual operations.

TABLE 37.—Units of coal-recovery augers sold to bituminous coal and lignite mines for surface use in the United States, as reported by manufacturers, by States

State	1957	1958	1959	1960	1961
Alabama	------	1	1	------	1
Illinois	------	------	1	------	------
Kentucky	16	13	21	8	5
Missouri	1	------	------	------	------
Ohio	7	4	7	5	5
Pennsylvania	7	6	7	7	4
Tennessee	1	5	2	1	1
Virginia	5	4	1	1	------
West Virginia	16	9	7	3	2
Total	53	42	47	25	18

MECHANICAL LOADING

Experiments in mechanical loading began around 1890, but it was not until 1925 that 1 percent of the total undergound output was mechanically loaded. During the next 10 years (1925–35), as better machines were developed, mechanical loading increased more than 1 percent per year, and in 1935 almost 14 percent of the total underground output was mechanically loaded. Development was rapid in some States and practically nothing in others. The percentage of underground production mechanically loaded in 1935 in certain States was as follows: Wyoming (90), Illinois (56), Indiana (64), Pennsylvania (7), West Virginia (2), and Kentucky (1). During the next 20 years (1935–55), mechanical loading increased rapidly, averaging more than 3 percent per year to 85 percent in 1955.

Although the increase in mechanical loading has leveled off in the past few years, the type of loading equipment has changed considerably. In the past 10 years the proportion produced by mobile loading into mine cars decreased from 34 to 3 percent of the total mechanically loaded, and mobile loading into shuttle cars increased from 46 to 56 percent; production from continuous-mining machines increased from 2 to 37 percent, and all other types of mechanical loading decreased from 18 to 4 percent.

The most important change in mechanical loading in recent years was the introduction of continuous-mining machines. In 1961, 84 million tons of bituminous coal was produced at 249 mines by continuous-mining machines, compared with 78 million tons in 1960 from 241 mines. In 1961, 100 mines, compared with 80 in 1960, used continuous-mining machines exclusively.

Sales of conveyors increased; sales of all other major types of loading and mining equipment decreased.

TABLE 38.—Growth of mechanical loading at underground bituminous coal and lignite mines in the United States

Year	Underground production (thousand net tons)							Percentage of underground production—		Number of mechanical loading units			
	Mechanically loaded					Hand-loaded into mine cars	Total underground production	Mechanically loaded	Hand-loaded into mine cars	Mobile loading machines	Scrapers and duck-bills [1]	Pit-car loaders and hand-loaded conveyors [1]	Continuous mining machines
	Mobile loading machines	Scrapers and duck-bills [1]	Pit-car loaders and hand-loaded conveyors [1]	Continuous mining machines	Total mechanically loaded								
1923	(2)	(2)	(2)	----------	[3] 1,880	550,745	552,625	0.3	99.7	(2)	(2)	(2)	----------
1924	(2)	(2)	(2)	----------	[3] 3,496	466,584	470,080	.7	99.3	(2)	(2)	(2)	----------
1925	(2)	(2)	(2)	----------	[3] 6,243	496,939	503,182	1.2	98.8	(2)	(2)	(2)	----------
1926	7,786	2,236	523	----------	[3] 10,545	545,899	556,444	1.9	98.1	295	160	(2)	----------
1927	(2)	(2)	(2)	----------	16,500	482,885	499,385	3.3	96.7	(2)	(2)	(2)	----------
1928	11,811	2,748	7,000	----------	21,559	459,397	480,956	4.5	95.5	397	212	1,040	----------
1929	16,432	2,859	18,571	----------	37,862	476,859	514,721	7.4	92.6	488	225	2,521	----------
1930	20,073	3,265	23,644	----------	46,982	400,702	447,684	10.5	89.5	545	290	2,876	----------
1931	19,407	3,282	24,873	----------	47,562	315.595	363,157	13.1	86.9	583	311	3,428	----------
1932	14,825	2,762	18,230	----------	35,817	254,252	290,069	12.3	87.7	548	287	3,112	----------
1933	17,865	2,647	17,309	----------	37,821	277,539	315,360	12.0	88.0	523	225	2,978	----------
1934	20,750	3,086	17,597	----------	41,433	297,145	338,578	12.2	87.8	534	276	2,862	----------
1935	24,675	3,713	18,789	----------	47,177	301,549	348.726	13.5	86.5	657	257	2,768	----------
1936	40,970	4,513	21,494	----------	66,977	343,985	410,962	16.3	83.7	980	340	2,787	----------
1937	(2)	(2)	(2)	----------	83,500	330,280	413,780	20.2	79.8	(2)	(2)	(2)	----------
1938	57,824	5,279	21,990	----------	85,093	233,045	318,138	26.7	73.3	1,405	463	2,918	----------
1939	76,442	7,766	26,504	----------	110,712	246,421	357,133	31.0	69.0	1,573	690	2,707	----------
1940	100,962	11.617	35,291	----------	147,870	269,734	417,604	35.4	64.6	1,720	772	2,960	----------
1941	126,478	16,208	43,981	----------	186,667	272,411	459,078	40.7	59.3	1,985	897	3,414	----------
1942	160,301	22,088	50.514	----------	232,903	282,587	515,490	45.2	54.8	2,301	1,155	3,522	----------
1943	179,008	24.266	46,531	----------	249,805	260,687	510,492	48.9	51.1	2,525	1,309	3,512	----------
1944	202,875	24,505	46,809	----------	274,189	244,489	518,678	52.9	47.1	2,737	1,418	3,477	----------
1945	198.668	22,758	41,086	----------	262,512	205,118	467,630	56.1	43.9	2,950	1,470	3,527	----------
1946	186,975	20,595	37,771	----------	245,341	175,617	420,958	58.3	41.7	3,200	1,596	3,563	----------
1947	229,836	22,775	45,546	----------	298,157	193,072	491,229	60.7	39.3	3,569	1,598	4,050	----------
1948	232.217	20,377	42,762	450	295,806	164,206	460,012	64.3	35.7	3,965	1,688	4,162	15
1949	174,639	14,333	30,804	2,600	222,376	109,447	331,823	67.0	33.0	4,155	1,529	4,329	50

1950	218, 126	14, 303	35, 446	4, 850	272, 725	120, 119	392, 844	69. 4	30. 6	4, 228	1, 368	4, 446	90
1951	246, 397	14, 010	37, 583	6, 061	304, 051	111, 791	415, 842	73. 1	26. 9	4, 302	1, 264	3, 904	108
1952	218, 982	10, 667	31, 130	8, 215	268, 994	87, 431	356, 425	75. 5	24. 5	4, 083	1, 068	3, 569	152
1953	232, 585	8, 770	25, 144	11, 830	278, 329	71, 222	349, 551	79. 6	20. 4	3, 985	878	2, 994	219
1954	206, 546	5, 083	15, 005	16, 336	242, 970	46, 142	289, 112	84. 0	16. 0	4, 314	681	2, 162	325
1955	243, 204	4, 510	15, 497	27, 460	290, 671	52, 794	343, 465	84. 6	15. 4	3, 819	510	1, 925	385
1956	248, 341	3, 883	15, 271	39, 907	307, 402	58, 372	365, 774	84. 0	16. 0	3, 854	472	1, 819	510
1957	236, 720	2, 781	12, 453	53, 783	305, 737	54, 912	360, 649	84. 8	15. 2	3, 755	375	1, 528	614
1958	178, 014	1, 560	7, 626	56, 373	243, 573	43, 311	286, 884	84. 9	15. 1	3, 434	249	1, 230	679
1959	171, 150	1, 010	5, 779	65, 792	243, 731	39, 703	283, 434	86. 0	14. 0	3, 121	144	1, 014	776
1960	162, 109	1, 232	4, 517	77, 928	245, 786	39, 102	284, 888	86. 3	13. 7	2, 952	159	931	879
1961	145, 134	1, 032	4, 863	84, 321	235, 350	37, 416	272, 766	86. 3	13. 7	2, 583	130	867	927

---

[1] For additional detail data by type of loading, see Minerals Yearbook 1959, vol. 2, p. 86. Canvass of pit-car loaders discontinued in 1951.

[2] Data not available.

[3] Exclusive of tonnage "Handled by conveyors."

TABLE 39.—Bituminous coal and lignite mechanically loaded underground in the United States, by type of loading equipment

Type of loading equipment	1960		1961	
	Net tons	Percentage of total	Net tons	Percentage of total
Mobile machines:				
Direct into mine cars	8,137,606	3.3	5,931,074	2.5
Onto conveyors	11,195,270	4.6	6,755,764	2.9
Into shuttle cars	142,775,484	58.1	132,446,554	56.3
Continuous-mining machines:				
Onto conveyors	10,474,509	4.3	11,031,679	4.7
Into shuttle cars	67,453,771	27.4	73,289,572	31.1
Scrapers and conveyors equipped with duckbills or other self-loading heads	1,232,019	.5	1,032,009	.4
Hand-loaded conveyors	4,517,116	1.8	4,863,270	2.1
Total mechanically loaded	245,785,775	100.0	235,349,922	100.0

TABLE 40.—Comparative changes in underground mechanical loading of bituminous coal and lignite by principal types of loading devices in the United States, by States

State	Loading machines [1] (nets tons)		Continuous-mining machines (net tons)		Hand-loaded conveyors (net tons)		Total mechanically loaded (net tons)		Total production at mines using mechanical loading devices (net tons)		Handled by each class (percent)					
											Loading machines [1]		Continuous-mining machines		Hand-loaded conveyors	
	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961
Alabama	8, 513, 777	8, 541, 293	829, 502	430, 600	336, 570	303, 420	9, 679, 849	9, 275, 313	9, 681, 871	9, 276, 302	87.9	92.1	8.6	4.6	3.5	3.3
Alaska	2, 095	82, 436	---	26, 858	---	---	2, 095	109, 294	66, 982	109, 294	100.0	75.4	---	24.6	---	---
Arkansas	9, 500	19, 041	13, 108	26, 273	90, 166	119, 281	112, 774	164, 595	112, 774	164, 595	8.4	11.6	11.6	16.0	80.0	72.4
Colorado	1, 293, 383	1, 325, 065	1, 040, 233	1, 464, 134	280, 048	276, 683	2, 613, 664	3, 065, 882	2, 835, 029	3, 075, 106	49.5	43.2	39.8	47.8	10.7	9.0
Illinois	16, 246, 149	14, 677, 428	6, 952, 413	7, 688, 010	---	---	23, 198, 562	22, 365, 438	23, 199, 394	22, 365, 438	70.0	65.6	30.0	34.4	---	---
Indiana	3, 948, 743	3, 294, 846	716, 207	1, 238, 605	---	---	4, 664, 950	4, 533, 451	4, 665, 909	4, 533, 451	84.6	72.7	15.4	27.3	---	---
Iowa	93, 281	77, 740	---	---	---	---	93, 281	77, 740	93, 281	77, 740	100.0	100.0	---	---	---	---
Kentucky	28, 372, 532	25, 630, 936	3, 861, 592	2, 635, 489	284, 189	242, 159	32, 518, 313	28, 508, 584	32, 634, 837	28, 653, 185	87.2	89.9	11.9	9.2	.9	.9
Maryland	---	---	---	---	97, 238	136, 321	97, 238	136, 321	106, 634	153, 979	---	---	---	---	100.0	100.0
Montana (bituminous)	91, 138	82, 348	---	---	5, 570	2, 343	96, 708	84, 691	96, 708	84, 691	94.2	97.2	---	---	5.8	2.8
New Mexico	---	---	203, 489	360, 768	---	609	203, 489	361, 377	203, 489	362, 781	---	---	100.0	99.8	---	.2
Ohio	5, 406, 495	4, 723, 506	2, 984, 789	3, 086, 521	99, 541	48, 956	8, 490, 825	7, 858, 983	8, 490, 825	7, 858, 983	63.7	60.1	35.1	39.3	1.2	.6
Oklahoma	12, 000	---	---	---	231, 802	143, 435	243, 802	143, 435	243, 802	144, 456	4.9		---	---	95.1	100.0
Pennsylvania	13, 419, 718	10, 702, 581	27, 012, 367	27, 883, 481	954, 491	963, 787	41, 386, 576	39, 549, 849	41, 539, 218	39, 828, 167	32.4	27.1	65 3	70.5	2.3	2.4
Tennessee	1, 834, 870	1, 734, 439	116, 597	129, 584	184, 764	187, 814	2, 136, 231	2, 051, 837	2, 152, 648	2, 055, 994	85.9	84.5	5.5	6.3	8.6	9.2
Utah	3, 464, 718	3, 256, 516	1, 479, 708	1, 899, 527	---	---	4, 944, 426	5, 156, 043	4, 944, 426	5, 156, 043	70.1	63.2	29.9	36.8	---	---
Virginia	13, 699, 143	13, 338, 215	1, 025, 447	2, 165, 568	137, 373	158, 676	14, 861, 963	15, 662, 459	15, 040, 562	15, 776, 950	92.2	85.2	6.9	13.8	.9	1.0
Washington	38, 045	32, 873	99, 253	74, 610	63, 130	69, 783	200, 428	177, 266	200, 428	177, 266	19.0	18.5	49.5	42.1	31.5	39.4
West Virginia	66, 661, 991	58, 421, 931	31, 556, 469	35, 174, 101	1, 712, 658	2, 167, 879	99, 931, 118	95, 763, 911	100, 281, 677	96, 193, 541	66.7	61.0	31.6	36.7	1.7	2.3
Wyoming	232, 801	224, 207	37, 106	37, 122	39, 576	42, 124	309, 483	303, 453	309, 483	303, 453	75.2	73.9	12.0	12.2	12.8	13.9
Total	163, 340, 379	146, 165, 401	77, 928, 280	84, 321, 251	4, 517, 116	4, 863, 270	245, 785, 775	235, 349, 922	246, 899, 977	236, 351, 415	66.5	62.1	31.7	35.8	1.8	2.1

[1] Includes mobile loading machines, scrapers, and conveyors equipped with duckbills or other self-loading heads.

TABLE 41.—Number of bituminous coal and lignite underground mines using mechanical loading devices and number of units in use in the United States, by States

State	Number of mines										Number of loading devices							
											Loading machines							
	Using loading machines only[1]		Using continuous-mining machines only		Using hand-loaded conveyors only		Using more than one type of mechanical loading		Total		Mobile		Scrapers and duckbills or other self-loading conveyors		Continuous-mining machines		Hand-loaded conveyors (number of units)	
	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961
Alabama	15	15		1	9	12	6	5	30	33	125	116	4	4	19	18	69	50
Alaska	2							1	2	1	4	7				1		
Arkansas					9	10	1	1	10	11	2	2			1	1	18	25
Colorado	34	31	3	4	17	15	7	5	61	55	56	63	36	32	14	22	44	42
Illinois	38	35	3	2			7	5	48	42	131	101	8	9	45	40		
Indiana	16	15		1			3	2	19	18	67	56			7	12		
Iowa	2	2							2	2	4	4						
Kentucky	115	137	7	7	11	12	14	11	147	167	437	440	5	5	49	39	51	44
Maryland					10	8			10	8							22	24
Montana (bituminous)	6	6			2	2			8	8	8	9	6	4			4	3
New Mexico			1	1		2			1	3					3	5		1
Ohio	18	17	5	4	11	8	4	4	38	33	89	84			38	35	19	17
Oklahoma					6	7	1		7	7	4						83	37
Pennsylvania	61	65	29	34	96	100	41	27	227	226	479	337	52	30	337	353	229	236
Tennessee	18	18	1	1	19	25	1	1	39	45	37	31	12	10	2	2	40	41
Utah	35	29	1	3			6	7	42	39	132	117	3	3	25	28		
Virginia	62	59		1	3	4	9	8	74	72	201	179			17	30	6	13
Washington	1	3	1		2	1	2	3	6	7	3	5			5	3	15	14
West Virginia	204	223	28	40	68	78	83	81	383	422	1,158	1,019	17	17	315	336	308	297
Wyoming	6	5	1	1	1	1	1	1	9	8	15	13	16	16	2	2	23	23
Total	633	660	80	100	264	285	186	162	1,163	1,207	2,952	2,583	159	130	879	927	931	867

[1] Includes mobile loading machines, scrapers, and conveyors, equipped with duckbills or other self-loading heads.

TABLE 42.—Production at bituminous coal and lignite underground mines in the United States, by States and methods of loading

State	Hand loaded (net tons)		Mechanically loaded (net tons)		Total underground production (net tons)		Underground output hand loaded (percent)		Underground output mechanically loaded (percent)	
	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961
Alabama	685,491	801,111	9,679,849	9,275,313	10,365,340	10,076,424	6.6	8.0	93.4	92.0
Alaska	64,887	--------	2,095	109,294	66,982	109,294	96.9	--------	3.1	100.0
Arizona	5,526	--------	--------	--------	5,526	--------	100.0	--------	--------	--------
Arkansas	--------	--------	112,774	164,595	112,774	164,595	--------	--------	100.0	100.0
Colorado	300,773	90,696	2,613,664	3,065,882	2,914,437	3,156,578	10.3	2.9	89.7	97.1
Georgia	4,215	4,426	--------	--------	4,215	4,426	100.0	100.0	--------	--------
Illinois	108,339	52,110	23,198,562	22,365,438	23,306,901	22,417,548	.5	.2	99.5	99.8
Indiana	87,952	75,418	4,664,950	4,533,451	4,752,902	4,608,869	1.9	1.6	98.1	98.4
Iowa	106,819	69,816	93,281	77,740	200,100	147,556	53.4	47.3	46.6	52.7
Kansas	3,584	1,882	--------	--------	3,584	1,882	100.0	100.0	--------	--------
Kentucky	11,950,161	10,313,291	32,518,313	28,508,584	44,468,474	38,821,875	26.9	26.6	73.1	73.4
Maryland	162,960	150,789	97,238	136,321	260,198	287,110	62.6	52.5	37.4	47.5
Missouri	88,273	70,946	--------	--------	88,273	70,946	100.0	100.0	--------	--------
Montana:										
Bituninous	8,019	5,067	96,708	84,691	104,727	89,758	7.7	5.6	92.3	94.4
Lignite	11,266	10,096	--------	--------	11,266	10,096	100.0	100.0	--------	--------
Total Montana	19,285	15,163	96,708	84,691	115,993	99,854	16.6	15.2	83.4	84.8
New Mexico	46,273	35,516	203,489	361,377	249,762	396,893	18.5	8.9	81.5	91.1
North Dakota (lignite)	2,403	1,981	--------	--------	2,403	1,981	100.0	100.0	--------	--------
Ohio	715,575	651,533	8,490,825	7,858,983	9,206,400	8,510,516	7.8	7.7	92.2	92.3
Oklahoma	3,766	5,261	243,802	143,435	247,568	148,696	1.5	3.5	98.5	96.5
Pennsylvania	2,683,984	1,892,798	41,386,576	39,549,849	44,070,560	41,442,647	6.1	4.6	93.9	95.4
Tennessee	1,802,395	1,783,143	2,136,231	2,051,837	3,938,626	3,834,980	45.8	46.5	54.2	53.5
Utah	10,267	3,202	4,944,426	5,156,043	4,954,693	5,159,245	.2	.1	99.8	99.9
Virginia	10,957,867	12,547,390	14,861,963	15,662,459	25,819,830	28,209,849	42.4	44.5	57.6	55.5
Washington	11,540	7,097	200,428	177,266	211,968	184,363	5.4	3.8	94.6	96.2
West Virginia	9,278,871	8,841,260	99,931,118	95,763,911	109,209,989	104,605,171	8.5	8.5	91.5	91.5
Wyoming	1,329	1,234	309,483	303,453	310,812	304,687	.4	.4	99.6	99.6
Total	39,102,535	37,416,063	245,785,775	235,349,922	284,888,310	272,765,985	13.7	13.7	86.3	86.3

TABLE 43.—Units of mechanical loading equipment sold to bituminous coal and lignite mines for underground use in the United States, as reported by manufacturers

Type of equipment	1957	1958	1959	1960	1961	Change from 1960 (percent)
Mobile loading machines	209	97	95	110	84	−23.6
Continuous-mining machines	168	107	140	128	115	−10.2
Scrapers	---	1	---	---	---	---
Conveyors [1]	159	92	65	47	66	+40.4
Total	536	297	300	285	265	−7.0
Number of manufacturers reporting	21	18	17	18	15	---

[1] Includes hand-loaded conveyors and those equipped with duckbills or other self-loading heads.

TABLE 44.—Units of mechanical loading equipment sold for use in bituminous coal and lignite mines in the United States, as reported by manufacturers, by States

State	Mobile loading machines		Continuous-mining machines		Room conveyors [1]	
	1960	1961	1960	1961	1960	1961
Alabama	20	10	4	1	4	3
Arkansas	---	---	1	---	---	---
Colorado	1	---	2	6	---	---
Illinois	1	4	7	7	---	---
Indiana	---	---	4	1	---	1
Kentucky	22	5	7	6	1	4
Maryland	1	---	---	---	6	---
Ohio	3	3	2	3	1	---
Pennsylvania	15	10	25	40	5	8
Tennessee	---	2	3	1	1	1
Utah	1	1	4	1	---	---
Virginia	3	2	1	7	---	---
West Virginia	43	47	68	42	29	49
Total	110	84	128	115	47	66

[1] Includes hand-loaded conveyors and those equipped with duckbills or other self-loading heads.

TABLE 45.—Units of conveying equipment sold for use in bituminous coal and lignite mines in the United States, as reported by manufacturers, by States

State	Bridge conveyors		Shuttle cars		Gathering and haulage conveyors [1]	
	1960	1961	1960	1961	1960	1961
Alabama	3	2	41	15	14	10
Arkansas	1	--------	--------	--------	--------	--------
Colorado	--------	--------	1	12	1	2
Illinois	1	2	10	3	10	4
Indiana	--------	--------	--------	--------	7	3
Kentucky	--------	4	19	20	--------	15
Maryland	2	--------	--------	2	1	--------
Ohio	--------	--------	14	2	11	3
Pennsylvania	18	3	45	53	13	33
Tennessee	2	1	--------	4	--------	1
Utah	--------	--------	11	3	1	--------
Virginia	--------	--------	2	2	9	10
West Virginia	41	32	76	98	25	30
Total	68	44	219	214	92	111

[1] Includes all gathering and haulage conveyors with a capacity over 500 feet, except main-slope conveyors.

MECHANICAL CLEANING

Mechanical cleaning means cleaning raw coal with mechanical devices that separate out impurities, usually by differences in specific gravity, and does not include coal that is only screened. Mechanical devices are divided into two general classes—wet and pneumatic. About 93 percent of the coal cleaned in 1961 was cleaned by wet methods. The various types of mechanical cleaning equipment are described in detail in Minerals Yearbook, 1953.[5]

All coal mechanically cleaned in 1961 has been classified into seven types. The percentage of total production cleaned by each class was as follows: Jigs (50), dense-medium processes (25), concentrating tables (11), pneumatic cleaning (7), classifiers (4), launders (2), and flotation (1). Magnetite and sand were most commonly used as mediums in cleaning bituminous coal by the dense-medium processes. Magnetite was used in cleaning 31 million tons, and sand was used in cleaning 28 million tons.

Although mechanical cleaning by froth flotation has been in use at bituminous coal mines in the United States since 1930, it was not until 1960 that the tonnage cleaned by this method was large enough to be listed separately. Thirty-five bituminous coal cleaning plants reported froth flotation cells in operation in 1961, in comparison with thirty-one in 1960.

---

[5] Young, W. H., R. L. Anderson, and E. M. Hall. Coal—Bituminous and Lignite. BuMines Minerals Yearbook, 1953, v. 2, 1956, pp. 94–96.

TABLE 46.—Growth of mechanical cleaning at bituminous coal and lignite mines in the United States

Year	Total production (thousand tons)	Mechanical cleaning					Percentage of total production mechanically cleaned
		Number of cleaning plants	Raw coal (thousand tons)	Cleaned coal (thousand tons)	Refuse (thousand tons)	Percentage of refuse to raw coal	
1927	517,763	(1)	(1)	27,692	(1)	(1)	5.3
1928	500,745	236	(1)	28,783	(1)	(1)	5.7
1929	534,989	280	40,241	36,799	3,442	8.6	6.9
1930	467,526	297	42,645	38,800	3,845	9.0	8.3
1931	382,089	312	39,529	36,172	3,357	8.5	9.5
1932	309,710	309	32,903	30,278	2,625	8.0	9.8
1933	333,630	290	37,682	34,558	3,124	8.3	10.4
1934	359,368	293	43,556	39,827	3,729	8.6	11.1
1935	372,373	320	49,473	45,361	4,112	8.3	12.2
1936	439,088	342	67,162	61,095	6,067	9.0	13.9
1937	445,531	(1)	(1)	65,000	(1)	(1)	14.6
1938	348,545	374	71,207	63,455	7,752	10.9	18.2
1939	394,855	366	88,895	79,429	9,466	10.6	20.1
1940	460,771	387	115,692	102,270	13,422	11.6	22.2
1941	514,149	417	133,379	117,540	15,839	11.9	22.9
1942	582,693	438	162,598	142,187	20,411	12.6	24.4
1943	590,177	432	167,310	145,576	21,734	13.0	24.7
1944	619,576	439	182,071	158,727	23,344	12.8	25.6
1945	577,617	439	172,899	147,886	25,013	14.5	25.6
1946	533,922	445	163,633	138,670	24,963	15.3	26.0
1947	630,624	461	206,620	174,436	32,184	15.6	27.7
1948	599,518	502	215,217	180,880	34,337	16.0	30.2
1949	437,868	571	184,691	153,652	31,039	16.8	35.1
1950	516,311	612	238,391	198,699	39,692	16.7	38.5
1951	533,665	631	289,838	241,010	49,828	17.2	45.0
1952	466,841	625	274,246	227,265	46,981	17.1	48.7
1953	457,290	611	295,654	241,759	53,895	18.2	52.9
1954	391,706	613	287,004	232,764	54,240	18.9	59.4
1955	464,633	575	335,458	272,715	62,743	18.7	58.7
1956	500,874	583	359,378	292,365	67,013	18.6	58.4
1957	492,704	593	376,546	304,027	72,519	19.3	61.7
1958	410,446	573	320,898	259,035	61,863	19.3	63.1
1959	412,028	555	337,138	269,787	67,351	20.0	65.5
1960	415,512	535	338,686	273,169	65,517	19.3	65.7
1961	402,977	503	328,200	264,711	63,489	19.3	65.7

(1) Data not available.

TABLE 47.—Mechanical cleaning at bituminous coal and lignite mines in the United States, 1961, by States

State	Total production (net tons)	Mechanical cleaning					Percentage of total production mechanically cleaned
		Number of cleaning plants	Raw coal (net tons)	Cleaned coal (net tons)	Refuse (net tons)	Percentage of refuse to raw coal	
Alabama	12, 915, 465	37	17, 904, 683	11, 439, 501	6, 465, 182	36. 1	88. 6
Alaska	736, 831	3	481, 514	293, 110	188, 404	39. 1	39. 8
Colorado	3, 677, 946	2	1, 153, 619	919, 202	234, 417	20. 3	25. 0
Illinois	45, 245, 563	55	48, 808, 078	40, 803, 492	8, 004, 586	16. 4	90. 2
Indiana	15, 106, 175	17	13, 692, 779	11, 243, 883	2, 448, 896	17. 9	74. 4
Kansas	663, 758	3	983, 455	624, 602	358, 853	36. 5	94. 1
Kentucky	63, 031, 743	82	49, 294, 901	40, 631, 270	8, 663, 631	17. 6	64. 5
Missouri	2, 937, 983	6	2, 715, 331	1, 911, 187	804, 144	29. 6	65. 1
Montana (bituminous)	97, 418	3	68, 020	61, 178	6, 842	10. 1	62. 8
New Mexico	412, 141	1	589, 952	360, 768	229, 184	38. 8	87. 5
Ohio	32, 225, 502	21	17, 351, 430	14, 503, 884	2, 847, 546	16. 4	45. 0
Oklahoma	1, 031, 540	3	295, 078	244, 984	50, 094	17. 0	23. 7
Pennsylvania	62, 652, 095	81	48, 704, 801	38, 214, 741	10, 490. 060	21. 5	61. 0
Tennessee	5, 859, 688	1	94, 015	89, 315	4, 700	5. 0	1. 5
Utah	5, 159, 245	6	4, 511, 225	3, 582, 470	928, 755	20. 6	69. 4
Virginia	30, 332, 298	22	17, 694, 135	15, 050. 255	2, 643, 880	14. 9	49. 6
Washington	190, 745	5	283, 380	186, 622	96, 758	34. 1	97. 8
West Virginia	113, 070, 448	153	103, 525, 184	84, 503, 771	19, 021, 413	18. 4	74. 7
Wyoming	2, 528 808	2	48, 215	46, 707	1, 508	3. 1	1. 8
Other States [1]	5, 101, 410	--------	--------	--------	--------	--------	--------
Total	402, 976, 802	503	328, 199, 795	264, 710, 942	63, 488, 853	19. 3	65. 7

---

[1] Includes Arkansas, Georgia, Iowa, and Maryland, and lignite from Montana, North Dakota, and South Dakota.

TABLE 48.—Mechanical cleaning of bituminous coal and lignite in the United States, by types of equipment

Year	Wet methods							Pneumatic methods	Grand total
	Jigs	Concentrating tables	Classifiers	Launders	Dense-medium processes	Unclassified[1]	Total		
				CLEAN COAL (THOUSAND NET TONS)					
1938	27,615	984	4,521	10,681	4,450	4,936	53,187	10,268	63,455
1939	37,056	1,402	5,917	12,809	4,683	5,867	67,734	11,695	79,429
1940	47,064	2,330	7,762	16,269	6,692	7,173	87,290	14,980	102,270
1941	53,287	2,510	8,177	16,954	9,344	10,106	100,378	17,162	117,540
1942	66,876	3,138	10,529	18,658	12,495	10,304	122,000	20,187	142,187
1943	66,092	2,929	11,854	17,424	13,388	12,688	124,375	21,201	145,576
1944	74,175	2,753	14,780	19,686	13,869	13,400	138,663	20,064	158,727
1945	68,609	2,594	14,203	18,980	12,875	13,209	130,470	17,416	147,886
1946	64,702	1,447	13,883	16,021	14,173	11,833	122,059	16,611	138,670
1947	85,931	2,980	14,648	17,902	17,702	16,920	156,083	18,353	174,436
1948	87,506	4,360	18,304	16,788	20,638	17,068	164,664	16,216	180,880
1949	72,423	4,040	14,865	11,238	17,821	20,321	140,708	12,944	153,652
1950	94,161	4,693	18,059	11,630	28,948	25,679	183,170	15,529	198,699
1951	101,746	5,811	23,174	10,362	33,840	46,497	221,430	18,580	240,010
1952	97,336	3,723	19,296	11,738	31,321	45,205	208,619	18,646	227,265
1953	101,001	4,002	18,312	11,988	36,805	50,386	222,494	19,265	241,759
1954	99,913	6,606	16,115	12,156	43,104	36,143	214,037	18,727	232,764
1955	114,538	7,443	17,656	11,400	49,332	52,051	252,420	20,295	272,715
1956	124,858	9,535	15,064	10,223	56,937	51,437	268,054	24,311	292,365
1957	133,844	14,389	14,282	8,306	63,678	44,760	279,259	24,768	304,027
1958	115,321	18,142	8,793	6,768	52,735	38,394	240,153	18,882	259,035
1959	126,836	27,453	8,935	7,305	66,951	14,058	251,538	18,249	269,787
1960	136,633	30,741	11,012	7,561	66,251	2,832	255,030	18,139	273,169
1961	133,360	30,158	9,263	6,529	65,148	2,562	247,020	17,691	264,711
				PERCENTAGE CLEANED					
1938	43.5	1.6	7.1	16.8	7.0	7.8	83.8	16.2	100.0
1939	46.6	1.8	7.5	16.1	5.9	7.4	85.3	14.7	100.0
1940	46.0	2.3	7.6	15.9	6.5	7.0	85.3	14.7	100.0
1941	45.3	2.2	7.0	14.4	7.9	8.6	85.4	14.6	100.0
1942	47.0	2.2	7.4	13.1	8.8	7.3	85.8	14.2	100.0
1943	45.4	2.0	8.1	12.0	9.2	8.7	85.4	14.6	100.0
1944	46.7	1.8	9.3	12.4	8.8	8.4	87.4	12.6	100.0
1945	46.4	1.8	9.6	12.8	8.7	8.9	88.2	11.8	100.0
1946	46.7	1.0	10.0	11.6	10.2	8.5	88.0	12.0	100.0
1947	49.3	1.7	8.4	10.3	10.1	9.7	89.5	10.5	100.0
1948	48.4	2.4	10.1	9.3	11.4	9.4	91.0	9.0	100.0
1949	47.1	2.6	9.7	7.3	11.6	13.3	91.6	8.4	100.0
1950	47.4	2.4	9.1	5.8	14.6	12.9	92.2	7.8	100.0
1951	42.4	2.4	9.7	4.3	14.1	19.4	92.3	7.7	100.0
1952	42.8	1.6	8.5	5.2	13.8	19.9	91.8	8.2	100.0
1953	41.8	1.6	7.6	4.9	15.2	20.9	92.0	8.0	100.0
1954	42.8	3.0	5.7	3.9	21.8	17.9	95.1	4.9	100.0
1955	42.0	2.7	6.5	4.2	18.1	19.1	92.6	7.4	100.0
1956	42.7	3.3	5.1	3.5	19.5	17.6	91.7	8.3	100.0
1957	44.0	4.8	4.7	2.7	21.0	14.7	91.9	8.1	100.0
1958	44.5	7.0	3.4	2.6	20.4	14.8	92.7	7.3	100.0
1959	47.0	10.2	3.3	2.7	24.8	5.2	93.2	6.8	100.0
1960	50.0	11.3	4.0	2.8	24.3	1.0	93.4	6.6	100.0
1961	50.4	11.4	3.5	2.4	24.6	1.0	93.3	6.7	100.0

---

[1] Of the total unclassified tonnage in 1960, 1,826,000 net tons was cleaned by flotation. In 1961, all of the tonnage under "Unclassified," namely, 2,562,000 net tons, was cleaned by flotation.

TABLE 49.—Mechanical cleaning at bituminous coal and lignite mines in the United States, by underground, strip, and auger mining

Year	Underground mines			Strip mines		
	Total production (net tons)	Cleaned		Total production (net tons)	Cleaned	
		Net tons	Percent		Net tons	Percent
1953	349,550,972	194,934,599	55.8	105,448,569	46,202,508	43.8
1954	289,112,031	184,372,053	63.8	98,134,250	47,772,295	48.7
1955	343,465,239	217,199,126	63.2	115,092,769	54,423,341	47.3
1956	365,774,043	232,231,914	63.5	127,055,382	58,271,513	45.9
1957	360,649,141	242,981,446	67.4	124,108,538	59,317,324	47.8
1958	286,884,244	198,710,828	69.3	116,241,787	58,932,257	50.7
1959	283,433,655	203,829,017	71.9	120,953,334	64,417,972	53.3
1960	284,888,310	205,804,076	72.2	122,629,664	66,356,125	54.1
1961	272,765,985	199,359,507	73.1	121,979,084	64,500,929	52.9

Year	Auger mines			Total, all mines		
	Total production (net tons)	Cleaned		Total production (net tons)	Cleaned	
		Net tons	Percent		Net tons	Percent
1953	2,290,908	621,470	27.1	457,290,449	241,758,577	52.9
1954	4,460,019	619,675	13.9	391,706,300	232,764,023	59.4
1955	6,075,400	1,093,017	18.0	464,633,408	272,715,484	58.7
1956	8,044,652	1,861,957	23.1	500,874,077	292,365,384	58.4
1957	7,946,237	1,728,424	21.8	492,703,916	304,027,194	61.7
1958	7,319,516	1,391,766	19.0	410,445,547	259,034,851	63.1
1959	7,640,513	1,539,698	20.2	412,027,502	269,786,687	65.5
1960	7,994,373	1,008,493	12.6	415,512,347	273,168,694	65.7
1961	8,231,733	850,506	10.3	402,976,802	264,710,942	65.7

TABLE 50.—Mechanical cleaning at bituminous coal and lignite mines in the United States, 1961, by States and by underground, strip, and auger mining

(Net tons)

State	Underground mines			Strip mines		
	Total production	Cleaned		Total production	Cleaned	
		Mechanically	Percent		Mechanically	Percent
Alabama	10,076,424	9,555,450	94.8	2,701,052	1,746,062	64.6
Alaska	109,294	----------	----------	627,537	293,110	46.7
Colorado	3,156,578	918,734	29.1	521,368	468	.1
Illinois	22,417,548	18,957,193	84.6	22,785,504	21,846,299	95.9
Indiana	4,608,869	3,565,865	77.4	10,497,306	7,678,018	73.1
Kansas	1,882	----------	----------	661,876	624,602	94.4
Kentucky	38,821,875	24,204,389	62.3	21,453,691	16,331,915	76.1
Missouri	70,946	----------	----------	2,867,037	1,911,187	66.7
Montana (bituminous)	89,758	58,396	65.1	7,660	2,782	36.3
New Mexico	396,893	360,768	90.9	15,248	----------	----------
Ohio	8,510,516	6,362,137	74.8	22,463,370	8,066,030	35.9
Oklahoma	148,696	40,218	27.0	882,844	204,766	23.2
Pennsylvania	41,442,647	33,790,480	81.5	20,744,848	4,387,566	21.2
Tennessee	3,834,980	15,862	.4	1,761,170	65,190	3.7
Utah	5,159,245	3,582,470	69.4	----------	----------	----------
Virginia	28,209,849	14,932,571	52.9	1,412,341	91,017	6.4
Washington	184,363	180,240	97.8	6,382	6,382	100.0
West Virginia	104,605,171	82,788,027	79.1	5,860,083	1,245,535	21.3
Wyoming	304,687	46,707	15.3	2,224,121	----------	----------
Other States [1]	615,764	----------	----------	4,485,646	----------	----------
Total	272,765,985	199,359,507	73.1	121,979,084	64,500,929	52.9

State	Auger mines			All mines, total		
	Total production	Cleaned		Production	Cleaned	
		Mechanically	Percent		Mechanically	Percent
Alabama	137,989	137,989	100.0	12,915,465	11,439,501	88.6
Alaska	----------	----------	----------	736,831	293,110	39.8
Colorado	----------	----------	----------	3,677,946	919,202	25.0
Illinois	42,511	----------	----------	45,245,563	40,803,492	90.2
Indiana	----------	----------	----------	15,106,175	11,243,883	74.4
Kansas	----------	----------	----------	663,758	624,602	94.1
Kentucky	2,756,177	94,966	3.4	63,031,743	40,631,270	64.5
Missouri	----------	----------	----------	2,937,983	1,911,187	65.1
Montana (bituminous)	----------	----------	----------	97,418	61,178	62.8
New Mexico	----------	----------	----------	412,141	360,768	87.5
Ohio	1,251,616	75,717	6.0	32,225,502	14,503,884	45.0
Oklahoma	----------	----------	----------	1,031,540	244,984	23.7
Pennsylvania	464,600	36,695	7.9	62,652,095	38,214,741	61.0
Tennessee	263,538	8,263	3.1	5,859,688	89,315	1.5
Utah	----------	----------	----------	5,159,245	3,582,470	69.4
Virginia	710,108	26,667	3.8	30,332,298	15,050,255	49.6
Washington	----------	----------	----------	190,745	186,622	97.8
West Virginia	2,605,194	470,209	18.0	113,070,448	84,503,771	74.7
Wyoming	----------	----------	----------	2,528,808	46,707	1.8
Other States [1]	----------	----------	----------	5,101,410	----------	----------
Total	8,231,733	850,506	10.3	402,976,802	264,710,942	65.7

---

[1] Includes Arkansas, Georgia, Iowa, and Maryland, and lignite from Montana, North Dakota, and South Dakota.

MECHANICAL CRUSHING

TABLE 51.—Mechanical crushing of bituminous coal and lignite at mines in the United States [1]

Year	Number of mines crushing coal	Coal crushed (net tons)	Percentage of production crushed at mines where crushing is done	Percentage of total production crushed	Percentage of production mechanically cleaned at mines where crushing is done
1940	716	35,251,061	19.3	7.7	(2)
1944	814	66,460,564	29.6	10.8	(2)
1945	830	70,936,898	32.4	12.3	(2)
1946	851	66,663,732	31.8	12.5	39.9
1947	904	88,985,858	35.7	14.1	41.4
1948	995	91,465,311	36.6	15.3	42.1
1949	1,120	77,327,691	39.0	17.7	47.3
1950	1,210	101,594,731	40.1	19.7	50.6
1951	1,374	118,663,712	39.6	22.2	54.8
1952	1,325	108,102,158	40.5	23.2	59.6
1953	1,239	116,493,415	42.5	25.5	62.7
1954	982	122,288,369	51.8	31.2	69.8
1955	1,225	161,470,318	52.8	34.8	68.4
1956	1,370	172,389,802	54.6	34.4	68.0
1957	1,452	173,098,257	52.5	35.0	70.5
1958	1,359	146,749,108	53.8	35.8	74.5
1959	1,393	151,225,633	51.9	36.7	74.3
1960	1,348	160,875,418	55.1	38.7	74.3
1961	1,217	146,765,297	52.3	36.4	77.6

[1] Data not available for 1941–43. Lignite and Virginia semianthracite mines are not included in 1940–49.
[2] Data not available.

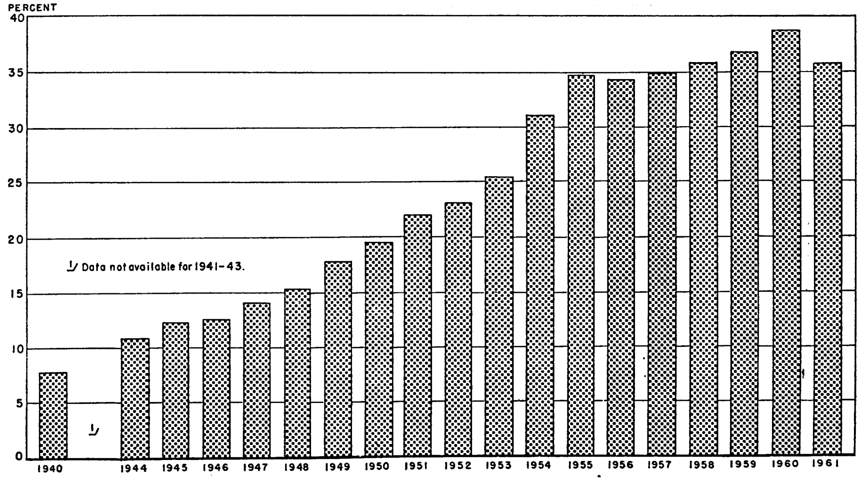

FIGURE 11.—Percentage of total production of bituminous coal and lignite crushed at mines in the United States, 1940 and 1944–61.

TABLE 52.—Mechanical crushing of bituminous coal and lignite at mines in the United States, by States

State	Number of mines crushing coal		Coal crushed (net tons)		Percentage of production crushed at mines where crushing is done		Percentage of total production crushed	
	1960	1961	1960	1961	1960	1961	1960	1961
Alabama	30	24	6,451,821	5,496,732	62.0	55.1	49.6	42.6
Alaska	6	4	416,243	533,130	98.6	86.3	57.6	72.4
Arizona	1	--------	3,820	--------------	95.6	--------	69.1	--------
Arkansas	11	10	319,416	280,664	99.6	93.2	78.1	71.1
Colorado	44	40	1,592,168	760,743	67.3	48.7	44.1	20.7
Illinois	83	74	18,912,562	17,427,966	45.4	42.5	41.1	38.5
Indiana	32	30	8,197,634	8,113,157	54.8	55.6	52.8	53.7
Iowa	23	22	722,773	650,258	76.9	79.9	67.7	70.1
Kansas	4	2	586,892	531,120	99.1	99.7	66.1	80.0
Kentucky	122	125	24,382,886	19,242,280	64.3	55.3	36.5	30.5
Maryland	15	14	268,491	225,837	78.7	67.3	35.9	29.8
Missouri	10	10	1,078,549	1,222,003	58.2	58.8	37.3	41.6
Montana: Bituminous	7	7	41,564	40,817	47.9	52.0	36.9	41.9
New Mexico	4	2	250,643	376,016	94.1	100.0	85.0	93.5
North Dakota (lignite)	12	15	1,239,758	2,104,858	66.5	82.5	49.1	77.2
Ohio	131	117	13,094,162	11,897,619	51.6	47.0	38.6	36.9
Oklahoma	12	14	810,801	618,221	89.4	89.0	60.4	59.9
Pennsylvania	328	280	31,356,577	27,541,041	66.9	65.2	47.9	44.0
South Dakota (lignite)	1	1	5,858	5,600	28.6	31.5	28.6	31.5
Tennessee	25	29	720,958	1,136,341	51.5	81.1	12.2	19.4
Utah	39	37	3,512,355	3,826,796	71.8	74.5	70.9	74.2
Virginia	72	55	8,704,837	8,412,787	61.6	53.6	31.3	27.7
Washington	5	7	41,800	20,375	22.5	11.7	18.3	10.7
West Virginia	320	286	36,656,275	34,272,404	44.4	44.0	30.8	30.3
Wyoming	11	12	1,506,575	2,028,532	84.1	85.3	74.4	80.2
Total	1,348	1,217	160,875,418	146,765,297	55.1	52.3	38.7	36.4

TREATMENT FOR ALLAYING DUST

TABLE 53.—Treatment of bituminous coal and lignite at mines for allaying dust in the United States [1]

Year	Grand total production (net tons)	Total production at mines where coal was treated (net tons)	Percentage of production treated at mines where treating is done	Percentage of total production treated	Net tons treated with—				
					Calcium chloride	Oil	Calcium chloride and oil	All other materials	Total
1940	460, 771, 500	161, 089, 959	22. 1	7. 7	2, 633, 291	25, 767, 651	4, 428, 113	2, 807, 728	35, 636, 783
1941	514, 149, 245	197, 476, 343	20. 0	7. 7	3, 957, 459	29, 258, 462	2, 482, 899	3, 844, 476	39, 543, 296
1942	582, 692, 937	202, 973, 885	17. 3	6. 0	10, 132, 809	11, 302, 020	6, 544, 658	7, 148, 064	35, 127, 551
1943	590, 177, 069	153, 863, 052	17. 3	4. 5	15, 049, 176	1, 720, 176	1, 947, 219	7, 966, 484	26, 683, 055
1944	619, 576, 240	172, 955, 108	17. 8	5. 0	7, 276, 702	13, 188, 883	4, 744, 580	5, 562, 565	30, 772, 730
1945	577, 617, 327	166, 935, 955	20. 1	5. 8	5, 115, 090	18, 875, 674	4, 647, 872	4, 910, 602	33, 549, 238
1946	533, 922, 068	166, 814, 848	22. 2	6. 9	4, 957, 622	24, 310, 109	3, 193, 070	4, 572, 360	37, 033, 161
1947	630, 623, 722	195, 840, 059	26. 4	8. 2	5, 822, 483	34, 667, 571	5, 571, 953	5, 732, 101	51, 794, 108
1948	599, 518, 229	196, 600, 489	25. 6	8. 4	6, 275, 121	34, 466, 534	4, 177, 987	5, 462, 054	50, 381, 696
1949	437, 868, 036	160, 978, 742	26. 0	9. 5	3, 670, 120	30, 448, 670	4, 380, 961	3, 275, 151	41, 774, 902
1950	516, 311, 053	210, 083, 657	25. 9	10. 5	4, 643, 186	41, 688, 159	4, 278, 212	3, 724, 314	54, 333, 871
1951	533, 664, 732	228, 802, 637	25. 6	11. 0	4, 694, 938	46, 142, 726	4, 587, 940	3, 172, 205	58, 597, 809
1952	466, 840, 782	211, 437, 141	24. 4	11. 0	4, 954, 080	41, 409, 886	3, 432, 199	1, 772, 111	51, 568, 276
1953	457, 290, 449	206, 374, 498	23. 7	10. 7	3, 362, 552	40, 671, 431	2, 769, 833	2, 154, 985	48, 958, 801
1954	391, 706, 300	202, 098, 539	27. 9	14. 4	2, 959, 979	47, 782, 165	3, 366, 955	2, 255, 872	56, 364, 971
1955	464, 633, 408	236, 115, 318	26. 5	13. 5	3, 160, 729	51, 157, 769	5, 696, 447	2, 513, 752	62, 528, 697
1956	500, 874, 077	243, 513, 231	26. 6	12. 9	5, 500, 522	52, 008, 545	4, 912, 374	2, 309, 732	64, 731, 173
1957	492, 703, 916	241, 733, 935	25. 6	12. 5	4, 112, 934	52, 051, 076	3, 809, 132	1, 852, 051	61, 825, 193
1958	410, 445, 547	188, 245, 095	28. 3	13. 0	3, 359, 434	42, 922, 129	4, 122, 397	2, 862, 670	53, 266, 630
1959	412, 027, 502	213, 407, 336	25. 6	13. 3	2, 716, 638	45, 139, 888	3, 419, 852	3, 403, 320	54, 679, 698
1960	415, 512, 347	221, 644, 878	26. 0	13. 9	4, 576, 176	46, 241, 261	4, 333, 350	2, 469, 508	57, 620, 295
1961	402, 976, 802	201, 807, 196	24. 6	12. 3	3, 616, 536	39, 130, 370	3, 448, 677	3, 385, 980	49, 581, 563

TABLE 53.—Treatment of bituminous coal and lignite at mines for allaying dust in the United States [1]—Continued

Year	Number of mines treating with—					Percentage of tonnage treated with—				
	Calcium chloride	Oil	Calcium chloride and oil	All other materials	Total [2]	Calcium chloride	Oil	Calcium chloride and oil	All other materials	Total
1940	51	486	22	62	614	7.4	72.3	12.4	7.9	100.0
1941	67	564	15	58	668	10.0	74.0	6.3	9.7	100.0
1942	167	334	73	117	603	28.8	32.2	18.6	20.4	100.0
1943	212	67	28	101	393	56.4	6.4	7.3	29.9	100.0
1944	145	192	47	83	434	23.6	42.9	15.4	18.1	100.0
1945	105	296	43	67	487	15.2	56.3	13.9	14.6	100.0
1946	79	380	41	51	546	13.4	65.6	8.6	12.4	100.0
1947	67	384	58	45	546	11.2	66.9	10.8	11.1	100.0
1948	68	474	48	46	629	12.5	68.4	8.3	10.8	100.0
1949	91	586	62	34	769	8.8	72.9	10.5	7.8	100.0
1950	106	688	32	45	838	8.5	76.7	7.9	6.9	100.0
1951	98	764	40	27	898	8.0	78.8	7.8	5.4	100.0
1952	101	723	30	20	865	9.6	80.3	6.7	3.4	100.0
1953	81	681	28	26	785	6.8	83.1	5.7	4.4	100.0
1954	83	614	29	29	737	5.2	84.8	6.0	4.0	100.0
1955	63	650	33	28	757	5.1	81.8	9.1	4.0	100.0
1956	73	642	35	30	763	8.5	80.3	7.6	3.6	100.0
1957	71	665	31	34	785	6.6	84.2	6.2	3.0	100.0
1958	60	596	36	33	720	6.3	80.6	7.7	5.4	100.0
1959	54	615	44	37	743	5.0	82.6	6.2	6.2	100.0
1960	64	635	56	26	748	7.9	80.3	7.5	4.3	100.0
1961	48	544	32	32	643	7.3	78.9	7.0	6.8	100.0

---

[1] All items except "Grand total production" exclude lignite and semianthracite, 1940–49. Data for 1940–45 include all mines with an average daily production of 50 tons and all mines with rail or river connections regardless of size. Data for 1946–61 include all mines producing 1,000 or more tons. The figures are reasonably comparable for all years.

[2] Because some mines used more than 1 method of treatment, this total is not the sum of the individual items.

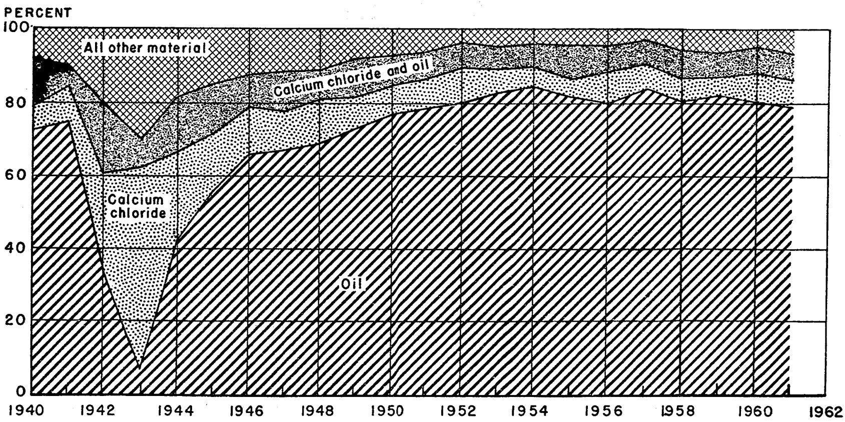

FIGURE 12.—Percentage of total bituminous coal and lignite treated for allaying dust at mines in the United States, 1940–61, by type of agent used.

TABLE 54.—Treatment of bituminous coal and lignite at mines for allaying dust in the United States, by States

State	Number of mines treating coal		Coal treated (net tons)		Percentage of production treated at mines where treating is done		Percentage of total production treated	
	1960	1961	1960	1961	1960	1961	1960	1961
Alabama	8	4	86, 150	53, 740	24. 6	23. 3	0. 7	0. 4
Arkansas	5	2	5, 577	3, 500	11. 3	23. 8	1. 4	. 9
Colorado	41	42	258, 419	256, 374	18. 3	18. 4	7. 2	7. 0
Illinois	80	67	4, 917, 042	4, 053, 195	11. 4	10. 5	10. 7	9. 0
Indiana	26	25	1, 208, 527	1, 002, 536	10. 6	9. 4	7. 8	6. 6
Iowa	5	5	12, 850	11, 579	10. 3	11. 6	1. 2	1. 2
Kansas	2	2	34, 626	17, 787	4. 4	2. 9	3. 9	2. 7
Kentucky	99	90	14, 933, 416	11, 261, 350	41. 2	38. 9	22. 3	17. 9
Maryland	3	--------	43, 919	------------	58. 2	--------	5. 9	--------
Missouri	6	6	83, 473	85, 618	7. 2	6. 1	2. 9	2. 9
Montana:								
Bituminous	8	7	32, 784	30, 114	35. 4	37. 3	29. 1	30. 9
Lignite	1	--------	12, 000	------------	6. 4	--------	6. 0	--------
Total Montana	9	7	44, 784	30, 114	16. 0	37. 3	14. 3	30. 9
New Mexico	--------	1	------------	200	--------	6. 5	--------	. 1
North Dakota (lignite)	18	17	801, 091	733, 461	33. 6	28. 7	31. 7	26. 9
Ohio	40	30	4, 665, 001	3, 711, 931	30. 8	28. 7	13. 7	11. 5
Oklahoma	5	4	67, 417	44, 500	18. 3	16. 5	5. 0	4. 3
Pennsylvania	107	88	6, 576, 280	5, 865, 258	27. 8	28. 5	10. 1	9. 4
South Dakota (lignite)	1	1	5, 858	5, 600	28. 6	31. 5	28. 6	31. 5
Tennessee	1	1	2, 000	800	4. 7	4. 9	. 1	--------
Utah	35	35	2, 710, 114	2, 285, 574	68. 5	60. 9	54. 7	44. 3
Virginia	46	35	3, 327, 432	4, 327, 599	27. 5	32. 3	12. 0	14. 3
Washington	1	1	478	1, 233	. 4	1. 0	. 2	. 6
West Virginia	197	168	17, 595, 973	15, 610, 182	26. 1	24. 2	14. 8	13. 8
Wyoming	13	12	239, 868	219, 432	16. 9	16. 1	11. 9	8. 7
Total	748	643	57, 620, 295	49, 581, 563	26. 0	24. 6	13. 9	12. 3

THERMAL DRYING

Because most of the bituminous coal produced in the United States is either sprayed with water underground to reduce the dust in mining, cleaned by wet methods, or subjected to wet screening in the tipple, the problem of removing surface moisture from the coal is vital. The moisture must be removed from bituminous coal for any one or a combination of the following reasons: (1) To avoid freezing difficulties and to facilitate handling the coal during shipment and transfer to the firebox; (2) to reduce the heat wasted in evaporation of surface moisture on the coal, thus increasing efficiency in burning; (3) to decrease transportation costs; (4) to improve the coal so that it may be used for specific purposes, such as producing coke and briquets; and (5) to facilitate drycleaning.

Removal of surface water from fine bituminous coal usually presents an individual problem at each preparation plant. Fine coal has a greater surface area per unit weight than coarse coal; therefore, its capacity for retaining moisture is proportionately greater. Removing water from coarse coal is relatively easy, but the problem is greater with coal that is 10-mesh or finer.[6]

The two components of the total moisture content of wetwashed coal are inherent and surface moisture. Inherent moisture is present in the coal in the bed. Surface moisture is attached to the surface of the coal particles or retained in cracks and fissures other than capillary openings in the coal substance.

There are three principal methods of removing surface moisture from coal: (1) Gravity drainage, (2) mechanical dewatering, and (3) thermal drying. Thermal drying is generally used on coals that cannot be readily dried by gravity drainage or mechanical means, such as screens, centrifuges, and filters.

The annual reports of bituminous coal and lignite producers to the Bureau of Mines for 1957 included data on thermal drying for the first time. These and succeeding reports have included data on thermal drying only at the preparation plant and have not included thermal drying at powerplants or other industrial plants.

Thermal driers have been arranged into six groups: (1) Rotary, (2) screen, (3) vertical tray and cascade, (4) continuous carrier, (5) suspension or flash (including fluidized-bed), and (6) multilouvre driers. A few producers did not furnish figures by type of equipment, and estimates were made for these plants.

Each type of thermal drier has been designed to handle a definite range of sizes of coal. The sizes of coal most commonly reported as thermally dried in 1961 were ¼- by 0-inch and ⅜- by 0-inch. The top sizes reported thermally dried in 1961 ranged from a maximum of 2 inches to a minimum of ⅛-inch.

Table 56 compares, by States, thermally dried with mechanically cleaned bituminous coal. In nine States, mines that operated bituminous coal cleaning plants in 1961 did no thermal drying.

Thermal drying of bituminous coal by States in 1960–61 is shown in table 57. Bituminous coal thermally dried amounted to 40 million tons, or 10 percent of the total production in the United States.

---

[6] Lyons, Orville R. Dewatering and Thermal Drying. AIME Coal Preparation 1950, pp. 648–715.

TABLE 55.—Thermal drying of bituminous coal and lignite in the United States, by type of drying equipment

Type of drier	Number of thermal drying units		Thermally dried (net tons)		Percentage of total	
	1960	1961	1960	1961	1960	1961
Rotary	11	11	771, 014	1, 007, 814	2. 0	2. 5
Screen	57	61	7, 205, 523	8, 176, 355	19. 0	20. 6
Vertical tray and cascade	58	64	5, 023, 497	5, 574, 594	13. 3	14. 1
Continuous carrier	6	5	894, 304	813, 122	2. 4	2. 1
Suspension or flash, including fluidized-bed	63	63	12, 504, 527	13, 450, 086	33. 0	33. 9
Multilouvre	57	56	11, 469, 532	10, 611, 069	30. 3	26. 8
Total	252	260	37, 868, 397	39, 633, 040	100. 0	100. 0

TABLE 56.—Comparison of thermal drying of bituminous coal and lignite with mechanical cleaning at mines in the United States, by States

State	Cleaning plants, number				Production mechanically cleaned (net tons)		Thermally dried (net tons)		Percentage of cleaned coal thermally dried	
	Total		With thermal drying							
	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961
Illinois	59	55	21	19	41, 684.769	40. 803, 492	5. 471, 849	5, 837. 195	13. 1	14. 3
Indiana	18	17	11	10	11, 529,405	11, 243, 883	2, 857, 669	2, 946, 874	24. 8	26. 2
Kentucky	82	82	9	9	44, 740, 661	40, 631, 270	2, 686, 688	1, 418, 077	6. 0	3. 5
Ohio	22	21	6	6	15, 216.802	14, 503, 884	1, 655, 739	2, 144, 960	10. 9	14. 8
Pennsylvania	85	81	9	11	40, 031,785	38, 214, 741	3, 353, 139	3, 489, 286	8. 4	9. 1
Utah	6	6	4	4	3. 370,544	3, 582, 470	1, 309, 832	1, 651, 295	38. 9	46. 1
Virginia	28	22	4	6	13, 277,391	15, 050, 255	3. 610, 426	4, 352, 731	27. 2	28. 9
Washington	5	5	2	2	223,361	186, 622	96. 000	102, 962	43. 0	55. 2
West Virginia	168	153	42	43	86, 643,899	84, 503, 771	16, 827, 055	17, 689, 660	19. 4	20. 9
Other States	62	61	------	------	16, 450,077	15, 990, 554	------------	------------	------	------
Total	535	503	108	110	273, 168,694	264, 710, 942	37, 868, 397	39, 633, 040	13. 9	15. 0

TABLE 57.—Thermal drying of bituminous coal and lignite at mines in the United States, by States

State	Number of thermal drying units		Grand total production (net tons)		Thermally dried (net tons)		Percentage of total production thermally dried	
	1960	1961	1960	1961	1960	1961	1960	1961
Illinois	50	49	45, 977, 486	45, 245, 563	5, 471, 849	5, 837, 195	11. 9	12. 9
Indiana	31	34	15, 537, 869	15, 106. 175	2, 857, 669	2, 946, 874	18. 4	19. 5
Kentucky	15	14	66, 846, 492	63, 031. 743	2, 686, 688	1, 418, 077	4. 0	2. 2
Ohio	17	17	33, 956, 772	32, 225, 502	1, 655, 739	2 144, 960	4. 9	6. 7
Pennsylvania	25	26	65, 425, 265	62, 652, 095	3, 353, 139	3, 489, 286	5. 1	5. 6
Utah	4	4	4, 954, 693	5, 159, 245	1, 309, 832	1, 651, 295	26. 4	32. 0
Virginia	18	22	27, 837, 895	30, 332, 298	3, 610, 426	4, 352, 731	13. 0	14. 4
Washington	3	3	228, 145	190, 745	96,000	102, 962	42. 1	54. 0
West Virginia	89	91	118, 944, 277	113, 070, 448	16. 827, 055	17, 689, 660	14. 1	15. 6
Other States	--------	--------	35, 803, 453	35, 962, 988	------------	------------	--------	--------
Total	252	260	415, 512, 347	402, 976, 802	37, 868, 397	39, 633, 040	9. 1	9. 8

PRODUCTION BY STATES AND COUNTIES

Detailed production and employment statistics are shown in table 58 for each coal-producing county in the United States from which three or more operators submitted reports for 1961. Statistics on counties with less than three reporting producers have been combined with data for "Other counties" to avoid disclosing individual figures, except when the Bureau has been granted permission to publish statistics separately. Production of mines on the border between two States has been credited to the State in which the coal was mined rather than to the State where the tipple was. If the coal was mined in both States, the tonnage was apportioned accordingly.

Bituminous coal and lignite were mined in 25 States and 321 counties. As soft coal is the source of a large part of the economic activity in many counties, the key items pertaining to the industry are published by counties and are useful in analyzing potential markets. These key items are (1) method of shipping the coal, (2) value, (3) number of men working daily, (4) days worked, and (5) tons per man per day.

The most striking fact illustrated by the following table is the wide variation among several counties in the same State, not only in production but also in average value and average tons per man per day. The differences in average value are due to quality of coal, method of mining, method of transportation, or market conditions. The differences in output per man per day are caused mostly by physical conditions, mining methods, and extent of mechanization.

TABLE 58.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous coal and lignite mines in the United States, 1961, by States and counties

County	Production (net tons)				Average value per ton [3]	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day [4]
	Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total					
ALABAMA									
Bibb	----------	40,607	----------	40,607	$3.74	34	107	3,627	11.20
Blount	53,853	107,123	----------	160,976	5.23	80	274	21,893	7.35
Cullman	21,432	9,700	----------	31,132	6.01	34	94	3,198	9.73
Jackson	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Jefferson	6,640,552	300,827	4,877	6,946,256	7.59	4,199	199	834,175	8.33
Marion	48,762	132,857	107	181,726	4.52	347	154	53,510	3.40
Shelby	341,159	79,783	----------	420,942	7.88	205	236	48,273	8.72
Tuscaloosa	750,574	19,719	1,244	771,537	4.01	199	191	37,953	20.33
Walker	2,769,921	468,070	999,655	4,237,646	6.88	1,386	209	289,507	14.64
Winston	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Other counties	50,821	73,822	----------	124,643	4.70	67	135	9,052	13.77
Total Alabama	10,677,074	1,232,508	1,005,883	12,915,465	7.04	6,551	199	1,301,188	9.93
ALASKA									
Total Alaska	721,519	6,299	9,013	736,831	$7.96	184	288	53,028	13.90

See footnotes at end of table.

TABLE 58.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous coal and lignite mines in the United States, 1961, by States and counties—Continued

County	Production (net tons)				Average value per ton [3]	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day [4]
	Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total					
				ARKANSAS					
Franklin	99, 386	----------	----------	99, 386	$6. 35	19	236	4, 475	22. 21
Johnson	96, 175	3, 200	----------	99, 375	7. 08	73	191	13, 927	7. 14
Logan	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Pope	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Sebastian	117, 238	8, 307	----------	125, 545	7. 76	170	147	24, 984	5. 03
Other counties	68, 254	2, 368	8	70, 630	8. 19	65	139	9, 030	7. 82
Total Arkansas	381, 053	13, 875	8	394, 936	7. 31	327	160	52, 416	7. 53
				COLORADO					
Delta	14, 344	42, 588	205	57, 137	$5. 34	57	152	8, 737	6. 54
El Paso	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Fremont	10, 253	298, 244	40	308, 537	3. 59	123	190	23, 387	13. 19
Garfield	----------	16, 092	----------	16, 092	7. 00	19	201	3, 868	4. 16
Gunnison	208, 404	49, 631	731	258, 766	6. 34	234	157	36, 757	7. 04
Huerfano	6, 624	40, 266	----------	46, 890	6. 32	76	131	9, 913	4. 73
La Plata	2, 953	25, 714	851	29, 518	4. 29	30	170	5, 107	5. 78
Las Animas	760, 260	32, 790	1, 321	794, 371	9. 52	511	198	101, 194	7. 85
Mesa	----------	19, 637	103, 938	123, 575	5. 44	75	205	15, 332	8. 06
Moffat	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Montrose	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Pitkin	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Rio Blanco	----------	10, 631	3	10, 634	6. 21	21	100	2, 127	5. 00
Routt	407, 566	36, 328	2, 628	446, 522	3. 84	109	189	20, 620	21. 65
Weld	501, 671	284, 437	8, 334	794, 442	4. 24	252	215	54, 228	14. 65
Other counties	650, 421	141, 041	----------	791, 462	7. 35	258	227	58, 529	13. 52
Total Colorado	2, 562, 496	997, 399	118, 051	3, 677, 946	6. 20	1, 765	193	339, 799	10. 82
				GEORGIA					
Walker	----------	4, 426	----------	4, 426	$5. 00	8	206	1, 651	2. 68
				ILLINOIS					
Adams	----------	35, 731	135	35, 866	$7. 04	16	149	2, 385	15. 04
Brown	----------	1, 730	----------	1, 730	4. 33	3	232	695	2. 49
Bureau	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Christian	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Clinton	----------	6, 837	4, 038	10, 875	5. 27	75	45	3, 356	3. 24
Douglas	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Franklin	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Fulton	4, 653, 096	302, 063	10, 088	4, 965, 247	4. 10	802	233	187, 074	26. 54
Gallatin	119, 448	16, 903	200	136, 551	3. 14	49	203	9, 970	13. 70
Greene	----------	6, 424	----------	6, 424	5. 40	2	240	480	13. 38
Grundy	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Henry	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Jackson	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Jefferson	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Kankakee	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Knox	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Logan	----------	25, 866	30	25, 896	4. 50	21	138	2, 893	8. 95
Macoupin	256, 755	52, 544	2, 893	312, 192	4. 13	170	167	28, 433	10. 98
Madison	43, 921	569, 888	9, 426	623, 235	4. 22	318	192	61, 101	10. 20
Marion	13, 287	8, 121	2, 700	24, 108	3. 80	39	125	4, 831	4. 99
Menard	----------	10, 593	----------	10, 593	6. 05	11	171	1, 882	5. 63
Mercer	4, 934	16, 038	----------	20, 972	5. 18	15	210	3, 155	6. 65
Montgomery	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)

See footnotes at end of table.

TABLE 58.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous coal and lignite mines in the United States, 1961, by States and counties—Continued

County	Production (net tons)				Average value per ton [3]	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day [4]
	Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total					
				ILLINOIS—Continued					
Peoria	556,800	308,813	972	866,585	$5.03	115	215	24,685	35.11
Perry	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Pope	42,511			42,511	2.00	12	104	1,244	34.17
Randolph	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
St. Clair	3,421,496	961,073	2,250	4,384,819	3.59	445	254	112,859	38.85
Saline	3,024,679	23,771	7,134	3,055,584	3.92	710	207	147,001	20.79
Sangamon		85,652	100	85,752	4.50	56	160	8,998	9.53
Schuyler	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Stark	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Vermilion	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Wabash		1,894		1,894	4.13	3	124	372	5.09
Washington	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Will	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Williamson	5,693,100	253,596	26,181	5,972,877	3.94	1,382	216	298,669	20.00
Other counties	22,685,237	1,911,774	64,841	24,661,852	3.88	4,611	218	1,006,551	24.50
Total Illinois	40,515,264	4,599,311	130,988	45,245,563	3.91	8,855	215	1,906,634	23.73
				INDIANA					
Clay	432,705	336,201	2,056	770,962	$4.12	167	240	40,025	19.26
Daviess	2,076	42,585		44,661	4.39	16	185	2,960	15.09
Dubois		24,458		24,458	4.13	16	158	2,532	9.66
Fountain		4,050		4,050	5.00	1	300	300	13.50
Gibson	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Greene	1,259,615	67,812	5,156	1,332,583	3.97	228	226	51,629	25.81
Knox	579,015	45,969	1,901	626,885	3.92	264	165	43,564	14.39
Owen	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Parke	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Pike	1,989,358	161,361	2,763	2,153,482	3.82	364	258	93,844	22.95
Spencer	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Sullivan	1,526,965	186,903	3,363	1,717,231	4.13	534	217	115,690	14.84
Vermillion		13,136		13,136	6.25	49	57	2,795	4.70
Vigo	1,207,499	181,981	610,421	1,999,901	4.20	617	226	139,488	14.34
Warrick	5,103,410	248,398	3,100	5,354,908	3.59	555	230	127,924	41.86
Other countries	867,706	164,595	31,617	1,063,918	4.28	409	187	76,366	13.93
Total Indiana	12,968,349	1,477,449	660,377	15,106,175	3.89	3,220	216	697,117	21.67
				IOWA					
Appanoose	6,523	39,939	618	47,080	$5.45	145	127	18,463	2.55
Lucas	12,971	15,740	100	28,811	4.82	18	252	4,527	6.36
Mahaska	167,889	60,524	14	228,427	3.39	59	286	16,895	13.52
Marion	358,214	151,571	359	510,144	3.42	131	182	23,844	21.40
Monroe	24,213	17,046	15	41,274	3.42	31	125	3,888	10.62
Van Buren		11,569	15	11,584	5.25	10	180	1,799	6.44
Wapello		59,836		59,836	3.41	20	223	4,455	13.43
Total Iowa	569,810	356,225	1,121	927,156	3.58	414	178	73,871	12.55
				KANSAS					
Bourbon		2,050		2,050	$5.12	2	98	196	10.46
Cherokee	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Coffey		1,474		1,474	4.67	2	150	300	4.91
Crawford	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Osage		3,382		3,382	6.15	9	131	1,177	2.87
Other counties	523,995	129,171	3,686	656,852	4.66	159	266	42,297	15.53
Total Kansas	523,995	136,077	3,686	663,758	4.67	172	256	43,970	15.10

See footnotes at end of table.

TABLE 58.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous coal and lignite mines in the United States, 1961, by States and counties—Continued

County	Production (net tons)				Average value per ton [3]	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day [4]
	Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total					
KENTUCKY									
Eastern Kentucky:									
Bell	1,159,152	583,558	696	1,743,406	$3.99	708	162	114,833	15.18
Boyd	--------	89,266	442	89,708	3.26	65	152	9,850	9.11
Breathitt	488,414	66,400	816	555,630	5.88	236	214	50,556	10.99
Carter	4,360	10,000	--------	14,360	4.63	17	140	2,374	6.05
Clay	532,017	840,521	166	1,372,704	3.80	1,772	127	224,281	6.12
Clinton	--------	20,362	--------	20,362	2.00	40	111	4,485	4.54
Elliott	--------	15,157	--------	15,157	3.98	19	204	3,808	3.98
Floyd	3,692,809	70,049	--------	3,762,858	5.82	1,999	186	372,739	10.10
Greenup	3,016	--------	--------	3,016	4.77	3	79	218	13.83
Harlan	3,163,425	567,211	9,173	3,739,809	5.19	2,242	174	390,463	9.58
Jackson	--------	69,111	--------	69,111	4.06	545	49	26,755	2.58
Johnson	86,342	97,400	--------	183,742	3.92	204	109	22,191	8.28
Knott	955,558	1,116,648	--------	2,072,206	2.83	1,200	131	157,213	13.18
Knox	159,200	96,627	220	256,047	3.28	466	69	32,182	7.96
Laurel	15,200	16,316	--------	31,516	3.69	64	76	4,836	6.52
Lawrence	--------	7,253	--------	7,253	3.73	36	52	1,868	3.88
Lee	24,953	18,432	--------	43,385	4.45	48	169	8,094	5.36
Leslie	1,242,774	435,551	1,351	1,679,676	4.17	1,018	182	185,709	9.04
Letcher	4,283,159	155,284	16,106	4,454,549	5.38	1,986	180	357,970	12.44
McCreary	408,997	65,595	--------	474,592	3.78	223	225	50,136	9.47
Magoffin	50,233	13,960	--------	64,193	4.42	78	168	13,181	4.87
Martin	15,495	3,661	--------	19,156	3.00	66	77	5,068	3.78
Morgan	830	44,000	--------	44,830	2.99	13	145	1,884	23.80
Owsley	100,000	--------	--------	100,000	2.00	20	200	4,000	25.00
Perry	3,350,844	69,882	3,856	3,424,582	4.36	1,689	161	272,666	12.56
Pike	6,580,813	869,486	12,194	7,462,493	4.48	3,496	166	581,796	12.83
Pulaski	61,191	53,182	14,270	128,643	4.06	122	158	19,312	6.66
Rockcastle	7,025	8,427	--------	15,452	3.58	138	65	8,936	1.73
Wayne	--------	1,748	--------	1,748	5.86	4	120	466	3.75
Whitley	387,464	171,685	189	559,338	3.46	579	158	91,296	6.13
Wolfe	--------	10,419	10	10,429	4.24	15	147	2,200	4.74
Total Eastern Kentucky	26,773,271	5,587,191	59,489	32,419,951	4.62	19,111	158	3,021,366	10.73
Western Kentucky:									
Butler	33,816	212,455	--------	246,271	2.97	100	153	15,296	16.10
Christian	85,605	--------	--------	85,605	6.77	16	242	3,875	22.09
Davies	854,146	164,362	--------	1,018,508	4.53	103	279	28,708	35.48
Grayson	--------	2,240	--------	2,240	3.29	4	50	224	10.00
Henderson	--------	246,971	3,397	250,368	2.98	131	207	27,125	9.23
Hopkins	10,216,108	279,853	1,895	10,497,856	3.56	2,342	199	466,304	22.51
McLean	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Muhlenberg	11,080,963	565,359	714	11,647,036	3.30	1,416	226	320,703	36.32
Ohio	3,117,907	18,471	--------	3,136,378	3.31	245	282	68,998	45.46
Union	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Webster	1,051,940	21,658	--------	1,073,598	3.01	224	202	45,225	23.74
Other counties	2,632,005	21,481	446	2,653,932	3.97	686	215	147,346	18.01
Total Western Kentucky	29,072,490	1,532,850	6,452	30,611,792	3.48	5,267	213	1,123,804	27.24
Total Kentucky	55,845,761	7,120,041	65,941	63,031,743	4.06	24,378	170	4,145,170	15.21
MARYLAND									
Allegany	38,573	141,500	--------	180,073	$4.24	162	167	27,112	6.64
Garrett	305,830	271,470	--------	577,300	3.64	344	164	56,460	10.22
Total Maryland	344,403	412,970	--------	757,373	3.79	506	165	83,572	9.06

See footnotes at end of table.

TABLE 58.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous coal and lignite mines in the United States, 1961, by States and counties—Continued

County	Production (net tons)				Average value per ton [3]	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day [4]
	Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total					
MISSOURI									
Adair	----------	36,774	550	37,324	$5.11	57	155	8,845	4.22
Barton	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Callaway	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Clark	----------	9,785	----------	9,785	5.30	8	164	1,313	7.45
Dade	----------	13,000	----------	13,000	5.25	9	285	2,457	5.29
Henry	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Lafayette	----------	13,898	97	13,995	7.23	75	184	13,721	1.02
Macon	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Putnam	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Ralls	----------	2,960	----------	2,960	5.00	4	107	446	6.63
Randolph	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
St. Clair	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Vernon	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Other counties	1,794,105	301,218	765,596	2,860,919	4.24	1,953	118	229,711	12.45
Total Missouri	1,794,105	377,635	766,243	2,937,983	4.28	2,106	122	256,493	11.45
MONTANA									
Bituminous coal:									
Blaine	----------	3,428	50	3,478	$8.00	7	157	1,101	3.16
Carbon	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Cascade	----------	1,589	----------	1,589	6.99	3	109	326	4.87
Musselshell	53,914	24,425	50	78,389	6.65	90	148	13,354	5.87
Rosebud	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Other counties	1,450	12,449	63	13,962	7.04	20	153	3,066	4.55
Total bituminous coal	55,364	41,891	163	97,418	6.76	120	149	17,847	5.46
Lignite:									
Custer	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Powder River	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Richland	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Sheridan	----------	5,227	23	5,250	3.86	6	164	986	5.32
Other counties	262,175	6,014	5	268,194	1.97	23	187	4,295	62.44
Total lignite	262,175	11,241	28	273,444	2.01	29	182	5,281	51.78
Total Montana	317,539	53,132	191	370,862	3.26	149	155	23,128	16.04
NEW MEXICO									
Colfax	360,453	6,349	315	367,117	$6.04	159	220	35,030	10.48
McKinley	----------	35,083	----------	35,083	5.73	37	183	5,540	6.33
Rio Arriba	2,491	2,061	----------	4,552	5.96	110	30	3,299	1.38
Sandoval	----------	2,314	----------	2,314	6.50	5	100	463	5.00
San Juan	----------	3,075	----------	3,075	5.00	6	100	615	5.00
Total New Mexico	362,944	48,882	315	412,141	6.01	317	142	44,947	9.17

See footnotes at end of table.

TABLE 58.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous coal and lignite mines in the United States, 1961, by States and counties—Continued

County	Production (net tons)				Average value per ton[3]	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day[4]
	Shipped by rail or water[1]	Shipped by truck	Used at mine[2]	Total					
NORTH DAKOTA (LIGNITE)									
Adams	8,293	9,556	----------	17,849	$3.66	6	167	1,002	17.81
Bowman	172,058	----------	----------	172,058	1.89	17	184	3,132	54.94
Burke	334,524	27,204	49,130	410,858	2.33	48	222	10,655	38.56
Burleigh	----------	13,084	----------	13,084	3.33	3	206	618	21.17
Divide	182,888	31,771	----------	214,659	2.45	45	212	9,592	22.38
Dunn	----------	6,148	----------	6,148	2.92	5	168	760	8.09
Grant	----------	21,964	----------	21,964	2.87	7	174	1,218	18.03
Hettinger	----------	3,100	----------	3,100	3.70	6	60	332	9.35
McLean	31,859	50,638	100	82,597	3.18	22	163	3,559	23.21
Mercer	941,562	22,724	88,727	1,053,013	2.16	97	203	19,786	53.22
Morton	----------	18,888	----------	18,888	2.51	12	160	1,898	9.95
Oliver	----------	8,728	----------	8,728	2.41	4	120	495	17.62
Stark	----------	102,278	----------	102,278	1.88	10	193	1,925	53.13
Ward	253,940	123,192	221,933	599,065	2.22	46	260	11,950	50.13
Williams	----------	1,981	----------	1,981	4.78	2	123	276	7.19
Total North Dakota	1,925,124	441,256	359,890	2,726,270	2.25	330	204	67,198	40.57
OHIO									
Athens	56,339	188,863	1,150	246,352	$4.58	170	159	27,114	9.09
Belmont	5,249,631	166,231	25,206	5,441,068	4.17	1,711	184	314,318	17.31
Carroll	149,236	361,766	16,354	527,356	3.38	176	242	42,669	12.36
Columbiana	139,058	1,096,251	----------	1,235,309	3.28	295	240	70,869	17.43
Coshocton	245,540	793,697	958,986	1,998,223	4.02	474	256	121,420	16.46
Gallia	592,223	135,080	466	727,769	2.90	201	223	44,865	16.22
Guernsey	138,656	51,210	49	189,915	3.45	95	157	14,881	12.76
Harrison	5,289,633	806,458	1,338,556	7,434,647	4.11	1,774	214	379,837	19.57
Hocking	----------	54,835	----------	54,835	3.87	38	116	4,419	12.41
Holmes	85,317	86,250	175	171,742	3.15	39	222	8,668	19.81
Jackson	51,623	245,965	----------	297,588	3.83	171	157	26,914	11.06
Jefferson	1,753,761	1,392,486	4,188	3,150,435	3.58	766	227	173,590	18.15
Lawrence	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Mahoning	----------	1,030,994	273	1,031,267	3.99	231	246	56,913	18.12
Meigs	11,834	220,921	----------	232,755	2.89	102	192	19,567	11.90
Morgan	----------	175,206	2,124,860	2,300,066	3.22	262	244	63,861	36.02
Muskingum	----------	101,397	----------	101,397	4.25	72	186	13,407	7.56
Noble	747,286	628,472	3,916	1,379,674	2.54	160	212	33,900	40.70
Perry	1,171,197	502,841	1,684	1,675,722	3.83	211	235	49,638	33.76
Portage	----------	91,312	6,310	97,622	3.74	23	317	7,291	13.39
Stark	----------	764,389	----------	764,389	3.63	162	292	47,185	16.20
Tuscarawas	523,457	1,750,428	1,683	2,275,568	3.64	634	244	154,996	14.68
Vinton	26,971	122,531	----------	149,502	4.33	107	183	19,602	7.63
Washington	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Wayne	----------	75,471	----------	75,471	3.27	32	148	4,717	16.00
Other counties	45,998	610,832	10,000	666,830	3.34	115	215	24,776	26.91
Total Ohio	16,277,760	11,453,886	4,493,856	32,225,502	3.77	8,021	215	1,725,417	18.68
OKLAHOMA									
Craig	60,454	71,653	----------	132,107	$3.72	69	221	15,237	8.67
Haskell	366,470	----------	----------	366,470	7.65	106	195	20,642	17.75
Le Flore	100,335	5,412	44	105,791	8.90	172	153	26,316	4.02
McIntosh	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Muskogee	4,050	----------	----------	4,050	5.82	5	66	312	12.98
Nowata	----------	5,021	----------	5,021	5.82	4	87	348	14.43
Okmulgee	----------	1,559	----------	1,559	3.94	2	140	295	5.29
Pittsburg	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Rogers	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Sequoyah	82,071	----------	----------	82,071	7.76	25	205	5,120	16.03
Other counties	320,192	14,169	110	334,471	5.53	213	222	47,226	7.08
Total Oklahoma	933,572	97,814	154	1,031,540	6.58	596	194	115,496	8.93

See footnotes at end of table.

TABLE 58.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous coal and lignite mines in the United States, 1961, by States and counties—Continued

County	Production (net tons)				Average value per ton[3]	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day[4]
	Shipped by rail or water[1]	Shipped by truck	Used at mine[2]	Total					
PENNSYLVANIA									
Allegheny	3, 446, 307	1, 071, 485	235, 467	4, 753, 259	$5. 94	2, 168	184	399, 580	11. 90
Armstrong	2, 261, 155	642, 698	106, 405	3, 010, 258	3. 98	1, 096	185	202, 230	14. 89
Beaver	----------	437, 197	----------	437, 197	3. 20	151	225	33, 904	12. 90
Bedford	----------	230, 516	----------	230, 516	3. 86	156	207	32, 325	7. 13
Blair	13, 012	37, 804	----------	50, 816	4. 26	37	238	8, 805	5. 77
Bradford	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Butler	1, 038, 667	1, 032, 164	4, 749	2, 075, 580	3. 58	570	208	118, 633	17. 50
Cambria	5, 098, 165	390, 766	537, 206	6, 026, 137	6. 03	4, 036	179	722, 107	8. 35
Cameron	8, 833	49, 337	----------	58, 170	3. 39	22	264	5, 817	10. 00
Centre	392, 037	419, 997	----------	812, 034	3. 72	277	249	69, 014	11. 77
Clarion	2, 066, 298	909, 746	7, 383	2, 983, 427	3. 53	684	246	168, 251	17. 73
Clearfield	5, 669, 678	967, 200	2, 298	6, 639, 176	3. 76	2, 481	205	508, 653	13. 05
Clinton	391, 831	15, 270	----------	407, 101	3. 79	116	202	23, 381	17. 41
Elk	172, 707	172, 466	63	345, 236	3. 52	167	176	29, 438	11. 73
Fayette	806, 182	302, 907	11, 331	1, 120, 420	5. 59	1, 145	187	213, 726	5. 24
Greene	9, 499, 089	35, 312	13, 713	9, 548, 114	6. 34	4, 095	198	809, 212	11. 80
Huntingdon	----------	35, 365	----------	35, 365	4. 08	42	144	6, 066	5. 83
Indiana	4, 024, 357	337, 181	283, 354	4, 644, 892	4. 98	2, 015	206	416, 086	11. 16
Jefferson	1, 185, 177	114, 504	4, 759	1, 304, 440	3. 31	597	186	110, 838	11. 77
Lawrence	----------	631, 774	----------	631, 774	3. 10	198	215	42, 514	14. 86
Lycoming	3, 550	54, 811	----------	58, 361	3. 21	30	168	5, 046	11. 57
McKean	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Mercer	460, 033	468, 069	300	928, 402	3. 62	176	276	48, 518	19. 14
Somerset	1, 492, 572	573, 340	29, 853	2, 095, 765	4. 35	1, 295	159	206, 277	10. 16
Tioga	11, 328	273, 655	----------	284, 983	4. 70	85	230	19, 572	14. 56
Venango	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Washington	8, 758, 114	1, 453, 812	134, 120	10, 345, 416	6. 37	4, 038	210	849, 305	12. 18
Westmoreland	2, 375, 429	622, 746	339, 288	3, 337, 463	5. 31	1, 589	182	289, 857	11. 51
Other counties	204, 327	283, 456	10	487, 793	3. 73	91	207	18, 837	25. 90
Total Pennsylvania	49, 378, 848	11, 562, 948	1, 710, 299	62, 652, 095	5. 17	27, 357	196	5, 357, 992	11. 69
SOUTH DAKOTA (LIGNITE)									
Dewey	----------	17, 555	250	17, 805	$4. 20	8	186	1, 487	11. 97
TENNESSEE									
Anderson	874, 168	572, 726	567	1, 447, 461	$3. 95	586	167	97, 869	14. 79
Bledsoe	23, 726	2, 880	----------	26, 606	3. 36	59	123	7, 256	3. 67
Campbell	814, 480	272, 395	----------	1, 086, 875	3. 33	895	134	119, 747	9. 08
Claiborne	311, 350	8, 279	----------	319, 629	3. 19	174	121	21, 092	15. 15
Cumberland	2, 790	24, 758	----------	27, 548	3. 03	38	122	4, 633	5. 95
Fentress	59, 704	15, 428	----------	75, 132	3. 01	304	69	20, 828	3. 61
Grundy	160, 315	24, 683	----------	184, 998	4. 19	61	182	11, 086	16. 69
Hamilton	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Marion	456, 342	223, 125	955	680, 422	3. 24	688	128	88, 330	7. 70
Morgan	67, 030	259, 466	----------	326, 496	3. 05	593	192	113, 599	2. 87
Overton	76, 282	5, 380	----------	81, 662	2. 79	125	151	18, 860	4. 33
Putnam	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Rhea	----------	55, 793	----------	55, 793	3. 19	46	200	9, 299	6. 00
Scott	367, 112	100, 553	----------	467, 665	3. 01	318	119	37, 779	12. 38
Sequatchie	384, 180	54, 235	100	438, 515	3. 74	405	161	65, 108	6. 74
Van Buren	148, 986	1, 200	----------	150, 186	3. 52	190	70	13, 219	11. 36
Other counties	434, 020	56, 130	550	490, 700	3. 99	175	186	32, 580	15. 06
Total Tennessee	4, 180, 485	1, 677, 031	2, 172	5, 859, 688	3. 53	4, 657	142	661, 285	8. 86
UTAH									
Carbon	3, 744, 966	156, 402	14, 513	3, 915, 881	$6. 16	1, 597	199	317, 847	12. 32
Emery	959, 182	157, 708	6, 995	1, 123, 885	5. 68	563	204	114, 917	9. 78
Iron	----------	52, 255	----------	52, 255	4. 94	24	233	5, 601	9. 33
Sevier	----------	47, 343	----------	47, 343	6. 13	11	224	2, 459	19. 25
Summit	----------	19, 881	----------	19, 881	4. 39	11	246	2, 705	7. 35
Total Utah	4, 704, 148	433, 589	21, 508	5, 159, 245	6. 03	2, 206	201	443, 529	11. 63

See footnotes at end of table.

TABLE 58.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous coal and lignite mines in the United States, 1961, by States and counties—Continued

County	Production (net tons)				Average value per ton [3]	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day [4]
	Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total					
VIRGINIA									
Buchanan	9,079,850	1,862,651	6,545	10,949,046	$3.75	6,773	193	1,310,094	8.36
Dickenson	7,794,269	644,126	33	8,438,428	4.14	2,128	218	464,120	18.18
Lee	295,900	156,958	86	452,944	3.59	404	152	61,409	7.38
Montgomery	----------	12,060	----------	12,060	3.40	18	131	2,417	4.99
Russell	1,758,165	171,768	4,678	1,934,611	4.73	818	193	158,216	12.23
Scott	4,697	12,795	----------	17,492	4.36	26	131	3,410	5.13
Tazewell	913,718	19,025	367	933,110	5.34	604	220	133,054	7.01
Wise	6,784,409	513,075	297,123	7,594,607	4.51	3,268	214	699,387	10.86
Total Virginia	26,631,008	3,392,458	308,832	30,332,298	4.16	14,039	202	2,832,107	10.71
WASHINGTON									
King	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Kittitas	114,014	7,763	3,854	125,631	$6.53	119	181	21,598	5.82
Lewis	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Thurston	----------	9,612	----------	9,612	7.00	13	124	1,610	5.97
Other counties	14,547	40,955	----------	55,502	8.87	58	185	10,748	5.16
Total Washington	128,561	58,330	3,854	190,745	7.24	190	179	33,956	5.62
WEST VIRGINIA									
Barbour	3,051,688	9,885	234	3,061,807	$4.38	1,152	176	203,030	15.08
Boone	5,095,641	91,572	9,182	5,196,395	4.64	2,048	181	369,846	14.05
Braxton	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Brooke	48,125	191,212	283,553	522,890	4.25	261	184	48,084	10.87
Clay	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Fayette	4,318,739	98,620	4,500	4,421,859	4.68	2,740	179	491,756	8.99
Gilmer	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Grant	----------	65,577	----------	65,577	3.47	48	218	10,471	6.26
Greenbrier	837,020	59,277	185	896,482	3.75	590	170	100,390	8.93
Harrison	6,313,345	77,374	199	6,390,918	4.34	1,917	194	371,936	17.18
Kanawha	8,864,854	270,798	5,463	9,141,115	4.35	3,108	204	635,025	14.39
Lewis	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Lincoln	33,250	----------	----------	33,250	3.27	16	93	1,482	22.44
Logan	14,204,535	25,874	16,580	14,246,989	4.42	5,173	205	1,058,866	13.45
Marion	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Marshall	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Mason	236,472	209,685	880	447,037	3.35	172	233	40,069	11.16
McDowell	12,088,984	603,489	226,793	12,919,266	6.43	5,284	199	1,053,269	12.27
Mercer	806,130	38,219	3,088	847,437	6.25	383	190	72,837	11.63
Mineral	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Mingo	4,899,576	130,549	7,990	5,038,115	4.99	1,822	195	355,235	14.18
Monongalia	5,798,826	183,093	----------	5,981,919	4.88	1,374	227	312,058	19.17
Nicholas	4,722,966	190,979	8,405	4,922,350	4.72	2,393	199	476,076	10.34
Ohio	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Pocahontas	237,944	1,100	----------	239,044	3.76	112	203	22,698	10.53
Preston	1,721,696	866,868	198	2,588,762	3.37	1,442	190	273,629	9.46
Putnam	----------	81,227	----------	81,227	4.35	53	179	9,491	8.56
Raleigh	6,179,259	402,355	15,715	6,597,329	5.40	3,234	195	630,908	10.46
Randolph	1,112,971	23,564	9,558	1,146,093	4.37	546	203	110,715	10.35
Taylor	184,923	11,921	4,026	200,870	3.37	145	167	24,171	8.31
Tucker	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Upshur	1,142,143	35,558	3	1,177,704	4.44	439	206	90,437	13.02
Wayne	36,327	17,700	----------	54,027	4.60	87	203	17,656	3.06
Webster	766,600	52,890	854	820,344	4.77	451	185	83,658	9.81
Wyoming	10,078,891	255,428	19,967	10,354,286	5.62	4,073	219	892,488	11.60
Other counties	13,814,314	199,928	1,663,114	15,677,356	4.94	4,548	209	949,588	16.51
Total West Virginia	106,595,219	4,194,742	2,280,487	113,070,448	4.94	43,611	200	8,705,869	12.99

See footnotes at end of table.

TABLE 59.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous coal and lignite mines in the United States, 1961, by States and counties—Continued

County	Production (net tons)				Average value per ton[3]	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day[4]
	Shipped by rail or water[1]	Shipped by truck	Used at mine[2]	Total					
WYOMING									
Campbell	380,033	22,819	44,595	447,447	$1.29	33	259	8,562	52.26
Carbon	377,034	1,242	317	378,593	2.60	58	216	12,542	30.19
Converse	----------	826,402	20	826,422	3.80	17	311	5,314	155.52
Fremont	----------	1,234	----------	1,234	6.17	4	100	411	3.00
Hot Springs	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Lincoln	281,802	----------	357	282,159	3.28	117	129	15,093	18.69
Sheridan	334,218	14,610	----------	348,828	3.36	38	243	9,248	37.72
Sweetwater	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Other counties	181,863	12,239	50,023	244,125	7.24	240	126	30,274	8.06
Total Wyoming	1,554,950	878,546	95,312	2,528,808	3.39	507	161	81,444	31.05
UNITED STATES									
Total United States	339,893,987	51,044,384	12,038,431	402,976,802	$4.58	150,474	193	29,048,764	13.87

[1] Includes coal loaded at mine directly into railroad cars or river barges, hauled by trucks to railroad sidings, and hauled by trucks to waterways.

[2] Includes coal used at mine for power and heat, made into beehive coke at mine, used by mine employees, all other uses at mine, taken by locomotive tender, and transported from mine to point of use by conveyor, tram, or pipeline.

[3] Value received or charged for coal f.o.b. mine. Includes a value for coal not sold but used by producers, such as mine fuel and coal coked, as estimated by producers at average prices that might have been received if such coal had been sold commercially.

[4] In certain counties the average tons per man per day is large owing to auger mining, strip mining, or mechanical loading underground.

[5] Included in "Other counties" to avoid disclosing individual operations.

TRANSPORTATION

Within recent years, methods of shipping bituminous coal and lignite from the mines have changed radically; shipments by rail have declined, and shipments by water and truck have increased. Usually, shipments by water or truck (particularly for short distances) cost less than rail freight rates. See figure 13.

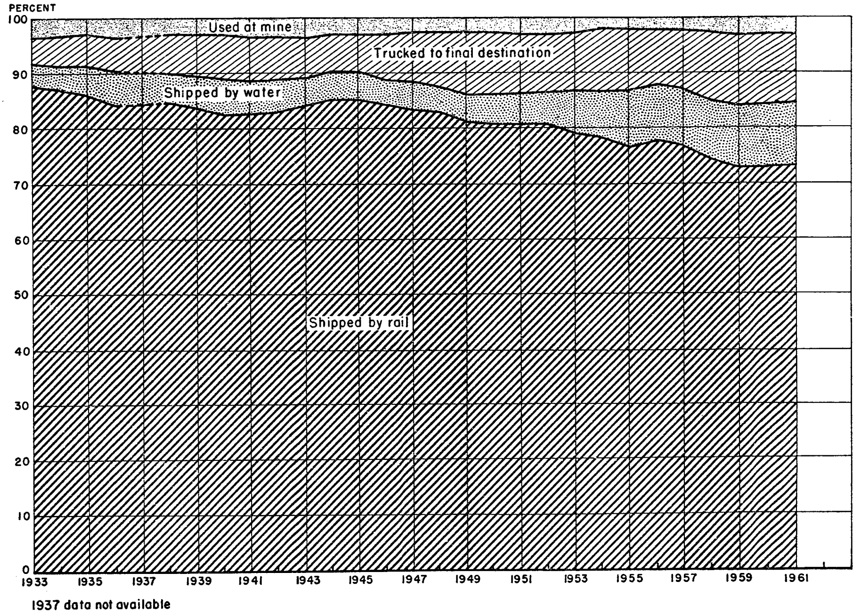

FIGURE 13.—Percentage of total production of bituminous coal and lignite, 1933–61, by method of shipment from mines, and percentage used at mines.

TABLE 59.—Bituminous coal and lignite shipped from mines, by method of shipment, and that used at mines in the United States

Year	Method of shipment from mines			Used at mine [1]	Total production
	Shipped by rail and trucked to rail	Shipped by water and trucked to water	Trucked to final destination		
	THOUSAND NET TONS				
1933	293,258	13,021	15,463	11,888	333,630
1934	313,304	15,128	18,739	12,197	359,368
1935	319,742	18,327	21,960	12,344	372,373
1936	370,763	24,868	27,929	15,528	439,088
1937	295,336	16,903	25,592	10,714	348,545
1938	(2)	(2)	(2)	(2)	445,531
1939	331,190	22,229	29,534	11,902	394,855
1940	380,388	29,493	35,540	15,350	460,771
1941	425,184	30,240	40,056	18,669	514,149
1942	482,814	34,018	45,154	20,707	582,693
1943	495,863	30,188	42,433	21,693	590,177
1944	527,136	31,518	40,123	20,799	619,576
1945	490,472	27,548	41,477	18,120	577,617
1946	450,615	24,642	42,731	15,934	533,922
1947	527,282	29,803	55,859	17,680	630,624
1948	498,194	26,735	58,260	16,329	599,518
1949	356,602	21,829	47,786	11,651	437,868
1950	417,225	27,583	58,286	13,217	516,311
1951	430,387	29,984	58,132	15,162	533,665
1952	375,911	27,746	50,231	12,953	466,841
1953	362,133	35,648	47,102	12,407	457,290
1954	305,918	32,912	44,689	8,187	391,706
1955	355,924	47,476	51,607	9,626	464,633
1956	390,015	50,732	49,768	10,359	500,874
1957	380,471	51,171	50,334	10,728	492,704
1958	305,642	43,899	50,605	10,300	410,446
1959	300,763	45,954	52,564	12,747	412,028
1960	303,865	46,784	52,699	12,164	415,512
1961	293,546	46,348	51,044	12,039	402,977
	PERCENTAGE OF TOTAL				
1933	87.9	3.9	4.6	3.6	100.0
1934	87.2	4.2	5.2	3.4	100.0
1935	85.9	4.9	5.9	3.3	100.0
1936	84.4	5.7	6.4	3.5	100.0
1937	(2)	(2)	(2)	(2)	100.0
1938	84.7	4.9	7.3	3.1	100.0
1939	83.9	5.6	7.5	3.0	100.0
1940	82.6	6.4	7.7	3.3	100.0
1941	82.7	5.9	7.8	3.6	100.0
1942	82.9	5.8	7.7	3.6	100.0
1943	84.0	5.1	7.2	3.7	100.0
1944	85.1	5.1	6.5	3.3	100.0
1945	84.9	4.8	7.2	3.1	100.0
1946	84.4	4.6	8.0	3.0	100.0
1947	83.6	4.7	8.9	2.8	100.0
1948	83.1	4.5	9.7	2.7	100.0
1949	81.4	5.0	10.9	2.7	100.0
1950	80.8	5.3	11.3	2.6	100.0
1951	80.7	5.6	10.9	2.8	100.0
1952	80.5	5.9	10.8	2.8	100.0
1953	79.2	7.8	10.3	2.7	100.0
1954	78.1	8.4	11.4	2.1	100.0
1955	76.6	10.2	11.1	2.1	100.0
1956	77.9	10.1	9.9	2.1	100.0
1957	77.2	10.4	10.2	2.2	100.0
1958	74.5	10.7	12.3	2.5	100.0
1959	73.0	11.1	12.8	3.1	100.0
1960	73.1	11.3	12.7	2.9	100.0
1961	72.9	11.5	12.6	3.0	100.0

---

[1] Includes coal used by mine employees, taken by locomotive tenders at tipples, used at mines for power and heat, transported from mines to point of use by conveyors or trams, made into beehive coke at mines, and all other uses at mines. [2] Data not available.

TABLE 60.—Bituminous coal and lignite loaded for shipment by railroads and waterways in the United States, 1961, as reported by mine operators

Route	State	By State (net tons)	Total for route (net tons)
RAILROAD			
Alabama Central	Alabama	54,595	54,595
Alaska	Alaska	721,519	721,519
Atchison, Topeka & Santa Fe	Colorado	6,761	518,114
	Illinois	150,900	
	New Mexico	360,453	
Baltimore & Ohio	Illinois	348,935	31,207,685
	Indiana	2,076	
	Maryland	1,449	
	Ohio	1,853,727	
	Pennsylvania	4,137,145	
	West Virginia	24,864,353	
Bessemer & Lake Erie	Pennsylvania	1,721,734	1,721,734
Cambria & Indiana	do	2,023,074	2,023,074
Campbell's Creek	West Virginia	31,400	31,400
Carbon County	Utah	1,365,074	1,365,074
Central of Georgia	Alabama	28,795	28,795
Chesapeake & Ohio	Kentucky	8,537,872	39,651,309
	Ohio	56,597	
	Virginia	114,018	
	West Virginia	30,942,822	
Cheswick & Harmar	Pennsylvania	406,774	406,774
Chicago, Burlington & Quincy	Illinois	6,531,984	8,073,296
	Iowa	192,933	
	Missouri	631,226	
	Wyoming	717,153	
Chicago & Eastern Illinois	Illinois	1,706,395	3,281,695
	Indiana	1,575,300	
Chicago & Illinois Midland	Illinois	4,361,001	4,361,001
Chicago, Milwaukee, St. Paul & Pacific	Indiana	1,463,337	1,697,602
	Montana (bituminous)	53,914	
	North Dakota (lignite)	180,351	
Chicago & North Western	Illinois	1,718,835	1,770,378
	Iowa	51,543	
Chicago, Rock Island & Pacific	Illinois	1,087,600	1,223,747
	Iowa	119,722	
	Missouri	15,000	
	Oklahoma	1,425	
Clinchfield	Virginia	2,802,171	2,802,171
Colorado & Southern	Colorado	2,552	2,552
Colorado & Wyoming	do	760,260	760,260
Conemaugh & Black Lick	Pennsylvania	1,561	1,561
Denver & Rio Grande Western	Colorado	1,291,252	3,875,304
	New Mexico	2,491	
	Utah	2,581,561	
Detroit, Toledo & Ironton	Ohio	700	700
Erie-Lackawanna	do	62,199	73,527
	Pennsylvania	11,328	
Great Northern	North Dakota (lignite)	517,412	517,412
Gulf, Mobile & Ohio	Alabama	232,110	932,342
	Illinois	700,232	
Illinois Central	do	10,773,288	22,905,639
	Indiana	59,000	
	Kentucky	12,073,351	
Illinois Terminal	Illinois	256,755	256,755
Interstate	Virginia	3,129,734	3,129,734
Johnstown & Stony Creek	Pennsylvania	55,702	55,702
Kansas City Southern	Oklahoma	420,475	420,475
Kentucky & Tennessee	Kentucky	408,997	408,997
Lake Erie, Franklin & Clarion	Pennsylvania	456,464	456,464
Louisville & Nashville	Alabama	1,419,950	24,312,867
	Illinois	2,000	
	Kentucky	19,837,760	
	Tennessee	1,153,452	
	Virginia	1,899,705	
Mary Lee	Alabama	726,106	726,106
Midland Valley	Arkansas	58,188	182,281
	Oklahoma	124,093	
Missouri-Illinois	Illinois	684,438	684,438
Missouri-Kansas-Texas	Kansas	430,103	1,261,250
	Missouri	700,407	
	Oklahoma	130,740	
Missouri Pacific	Arkansas	263,815	4,550,776
	Illinois	4,258,471	
	Missouri	28,490	

TABLE 60.—Bituminous coal and lignite loaded for shipment by railroads and waterways in the United States, 1961, as reported by mine operators—Con.

Route	State	By State (net tons)	Total for route (net tons)
RAILROAD—continued			
Monon	Indiana	231,418	231,418
Monongahela	Pennsylvania	933,024	6,183,858
	West Virginia	5,250,834	
Montour	Pennsylvania	1,138,399	1,138,399
New York Central (includes coal shipped over Kanawha & Michigan, Kelley's Creek, Toledo & Ohio Central, and Zanesville & Western).	Illinois	4,683,547	21,478,225
	Indiana	5,580,839	
	Ohio	2,606,869	
	Pennsylvania	4,774,705	
	West Virginia	3,832,265	
New York, Chicago & St. Louis	Ohio	4,907,665	4,907,665
Norfolk & Western	Kentucky	3,581,594	51,891,378
	Ohio	1,100	
	Virginia	18,404,668	
	West Virginia	29,904,016	
Northern Pacific	Montana (bituminous)	263,625	1,319,736
	North Dakota (lignite)	941,562	
	Washington	114,549	
Pacific Coast	do	14,012	14,012
Pennsylvania	Illinois	2,742	19,925,944
	Indiana	2,174,203	
	Ohio	2,677,477	
	Pennsylvania	15,069,155	
	West Virginia	2,367	
Pittsburg & Shawmut	Pennsylvania	1,469,573	1,469,573
Pittsburgh & Lake Erie	do	444,248	444,248
Pittsburgh & West Virginia	Ohio	478,861	478,861
St. Louis-San Francisco	Alabama	673,978	1,258,956
	Arkansas	59,050	
	Kansas	93,892	
	Missouri	175,197	
	Oklahoma	256,839	
Soo Line	North Dakota (lignite)	285,799	285,799
Southern	Alabama	2,389,586	4,709,872
	Indiana	22,139	
	Kentucky	468,085	
	Tennessee	1,549,350	
	Virginia	280,712	
Southern Iowa	Iowa	3,147	3,147
Tennessee	Tennessee	759,465	759,465
Tennessee Central	do	563,006	563,006
Tennessee Coal, Iron & Railroad Co	Alabama	2,200,086	2,200,086
Toledo, Peoria & Western	Illinois	438,544	438,544
Union Pacific	Colorado	501,671	1,339,468
	Wyoming	837,797	
Unity	Pennsylvania	266,609	266,609
Utah	Utah	757,513	757,513
Wabash	Iowa	202,465	446,250
	Missouri	243,785	
Western Allegheny	Pennsylvania	179,461	179,461
Western Maryland	Maryland	342,954	3,424,613
	Pennsylvania	198,185	
	West Virginia	2,883,474	
Woodward Iron Company	Alabama	923,752	923,752
Youngstown & Southern	Ohio	51,276	51,276
Total railroad shipments		293,546,239	293,546,239

TABLE 60.—**Bituminous coal and lignite loaded for shipment by railroads and waterways in the United States, 1961, as reported by mine operators—Con.**

Route	State	By State (net tons)	Total for route (net tons)
WATERWAY			
Allegheny River	Pennsylvania	1, 879, 349	1, 879, 349
Black Warrior River	Alabama	1, 811, 238	1, 811, 238
Green River	Kentucky	6, 953, 070	6, 953, 070
Guyandot River	West Virginia	33, 250	33, 250
Illinois River	Illinois	2, 462, 451	2, 462, 451
Inland Water Way	Alabama	216, 878	216, 878
Kanawha River	West Virginia	4, 303, 092	4, 303, 092
Kentucky River	Kentucky	122, 361	122, 361
Monongahela River	Pennsylvania	14, 212, 358	18, 072, 842
	West Virginia	3, 860, 484	
Ohio River	Illinois	347, 146	10, 338, 005
	Indiana	1, 860, 037	
	Kentucky	3, 862, 671	
	Ohio	3, 581, 289	
	West Virginia	686, 862	
Tennessee River	Tennessee	155, 212	155, 212
Total waterway shipments		46, 347, 748	46, 347, 748
Total loaded at mines for shipment by railroads and waterways		339, 893, 987	339, 893, 987
Shipped by truck from mine to final destination		51, 044, 384	51, 044, 384
Used at mine [1]		12, 038, 431	12, 038, 431
Total production, 1961		402, 976, 802	402, 976, 802

[1] Includes coal used at mine for power and heat, made into beehive coke at mine, used by mine employees, all other uses at mine, taken by locomotive tender, and transported from mine to point of use by conveyor, tram, or pipeline.

CONSUMPTION

The statistics on consumption of bituminous coal and lignite, by major consumer classes, are based upon complete coverage of all consumers in each class except "Other manufacturing and mining industries" and "Retail deliveries to other consumers." The figures for both categories are based upon a monthly sample approximating 35 percent coverage. A new benchmark representing complete coverage for "Other manufacturing and mining industries" was established for 1954, based upon data from the Census of Manufactures and the Census of Mineral Industries. The new benchmark for "Retail deliveries to other consumers" for 1954 represents the residual tonnage not otherwise accounted for and includes some coal shipped by truck from mine to final destination.

Data for each month are determined by matching plants reporting for the latest month with identical plants reporting the preceding month, calculating the percentage change from the previous month, and applying this percentage change to the published figure for the previous month. The results have been reasonably reliable over a period of years. A detailed analysis of the establishment of the new benchmarks and the revisions in "Cement mills," "Steel and rolling mills," and "Bunker, foreign and lake vessels," is given in Bureau of Mines Weekly Coal Report 2113, March 14, 1958. The total of the classes approximates total consumption and is a much more reliable figure than "calculated" consumption based on production, imports, exports, and changes in stocks, because certain significant items of stocks are not included in yearend stocks. See figure 14.

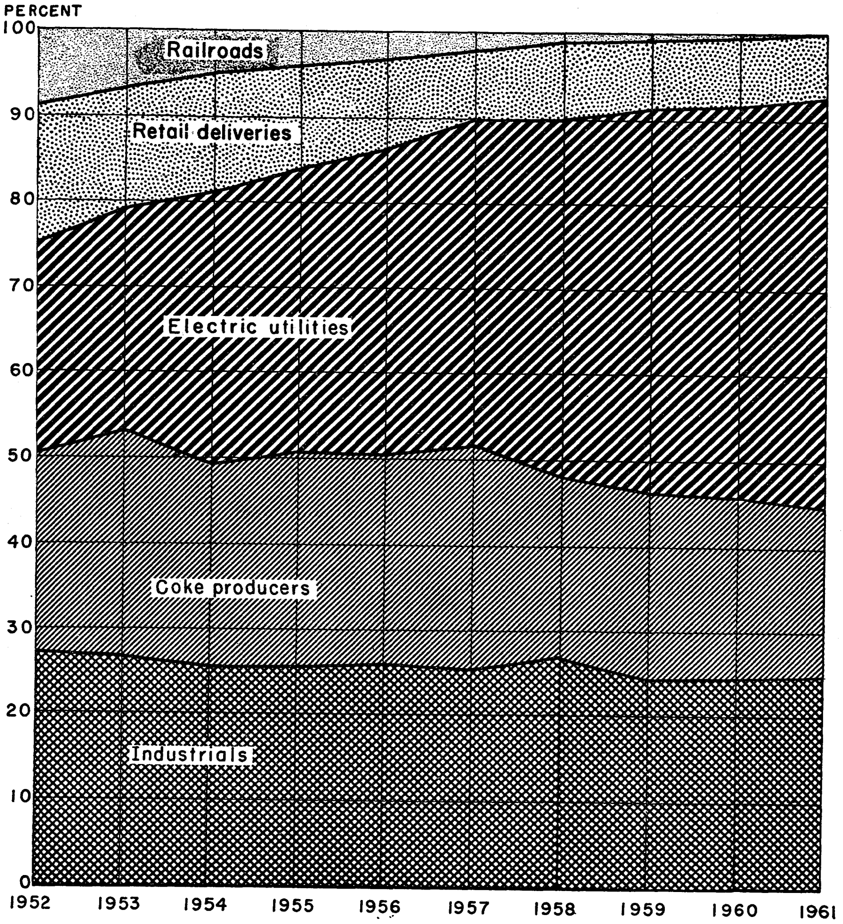

FIGURE 14.—Percentage of total consumption of bituminous coal and lignite, by consumer class, and retail deliveries in the United States, 1952–61.

TABLE 61.—Consumption of bituminous coal and lignite, by consumer class, with retail deliveries in the United States

(Thousand net tons)

Year and month	Electric power utilities[1]	Bunker, foreign and lake vessel[2]	Railroads (class I)[3]	Manufacturing and mining industries					Retail deliveries to other consumers[6]	Total of classes shown[7]
				Beehive coke plants	Oven coke plants	Steel and rolling mills[4]	Cement mills	Other manufacturing and mining industries[5]		
1933	27,088	2,298	72,548	1,408	38,681	14,129	2,760	81,377	77,396	317,685
1934	29,707	2,423	76,037	1,635	44,343	15,391	3,457	87,314	83,507	343,814
1935	30,936	2,683	77,109	1,469	49,046	16,585	3,456	94,598	80,444	356,326
1936	38,104	3,052	86,391	2,698	63,244	19,019	4,711	111,030	80,044	408,293
1937	41,045	3,433	88,080	4,927	69,575	18,148	5,182	124,056	76,331	430,777
1938	36,440	2,310	73,921	1,360	45,266	11,877	4,413	94,196	66,498	336,281
1939	42,304	2,764	79,072	2,298	61,216	13,843	5,194	100,637	68,770	376,098
1940	49,126	2,989	85,130	4,803	76,583	14,169	5,559	107,864	84,687	430,910
1941	59,888	3,304	97,384	10,529	82,609	15,384	6,735	121,880	94,402	492,115
1942	63,472	3,226	115,410	12,876	87,974	14,722	7,462	132,767	102,141	540,050
1943	74,036	3,042	130,283	12,441	90,019	15,864	5,842	142,149	120,121	593,797
1944	76,656	3,069	132,049	10,858	94,438	15,152	3,767	131,498	122,112	589,599
1945	71,603	3,192	125,120	8,135	87,214	14,241	4,203	126,562	119,297	559,567
1946	68,743	2,632	110,166	7,167	76,121	12,151	6,990	117,732	98,684	500,386
1947	86,009	3,087	109,296	10,475	94,325	14,195	7,919	123,928	96,657	545,891
1948	95,620	2,552	94,838	10,322	96,984	14,193	8,546	110,060	86,794	519,909
1949	80,610	2,056	68,123	5,354	85,882	10,529	7,966	96,629	88,389	445,538
1950	88,262	2,042	60,969	9,088	94,757	10,877	7,923	95,862	84,422	454,202
1951	101,898	2,220	54,005	11,418	102,030	11,260	8,507	103,188	74,378	468,904
1952	103,309	1,839	37,962	6,912	90,702	9,632	7,903	93,637	66,861	418,757
1953	112,283	1,839	27,735	8,226	104,648	8,764	8,167	95,160	59,976	426,798
1954	115,235	1,244	17,370	980	84,411	6,983	7,924	77,115	51,798	363,060
1955	140,550	1,499	15,473	2,869	104,508	7,353	8,529	89,611	53,020	423,412
1956	154,983	1,470	12,308	4,043	101,870	7,189	9,026	93,302	48,667	432,858
1957	157,398	1,364	8,401	3,473	104,547	6,938	8,633	87,202	35,712	413,668
1958	152,928	955	3,725	1,017	75,563	7,268	8,256	81,372	35,619	366,703
1959	165,788	969	2,600	1,827	77,354	6,674	8,510	73,396	29,138	366,256
1960:										
January	15,867	2	263	197	8,707	825	704	7,542	4,063	38,170
February	15,008	2	248	212	8,386	782	623	7,263	3,986	36,510
March	16,111	5	251	225	8,878	857	673	7,895	4,269	39,164
April	13,083	87	185	166	8,011	591	675	6,300	1,729	30,827
May	13,119	143	145	130	7,469	528	775	6,035	1,323	29,667
June	13,197	139	111	98	6,421	483	721	5,691	1,098	27,959
July	13,403	118	99	87	5,630	429	715	5,014	1,119	26,614
August	14,673	121	107	127	5,546	465	680	5,465	1,616	28,800
September	13,663	115	112	102	5,070	461	648	5,312	1,978	27,461
October	14,305	125	192	94	5,485	548	643	6,162	2,609	30,163
November	14,695	74	175	102	4,946	624	671	6,575	2,729	30,591
December	16,758	14	213	100	4,826	785	688	7,233	3,886	34,503
Total	173,882	945	2,101	1,640	79,375	7,378	8,216	76,487	30,405	380,429
1961:										
January	16,903	1	(8)	104	4,949	837	600	7,255	4,069	34,718
February	14,730	--------	(8)	103	4,684	735	492	6,384	3,097	30,225
March	14,773	3	(8)	118	5,223	722	593	6,761	2,273	30,466
April	13,500	45	(8)	109	5,382	645	595	6,234	1,909	28,419
May	13,574	89	(8)	136	6,070	590	663	6,128	1,193	28,443
June	13,722	97	(8)	133	6,019	519	680	5,785	1,010	27,965
July	14,201	99	(8)	123	6,151	472	695	5,490	1,007	28,238
August	15,336	111	(8)	144	6,359	507	642	5,814	1,710	30,623
September	14,797	104	(8)	127	6,498	505	632	5,797	2,173	30,633
October	15,352	103	(8)	138	6,931	561	668	6,754	2,860	33,367
November	15,734	99	(8)	129	6,860	645	657	7,105	2,789	34,018
December	17,007	19	(8)	132	7,259	757	698	7,773	3,645	37,290
Total	179,629	770	(8)	1,496	72,385	7,495	7,615	77,280	27,735	374,405

---

[1] Federal Power Commission.

[2] Bureau of the Census, U.S. Department of Commerce. Ore and Coal Exchange.

[3] Association of American Railroads. Represents consumption of bituminous coal and lignite for all uses, including locomotive, powerhouse, shop, and station fuel.

[4] Estimates based upon reports collected from a selected list of representative steel and rolling mills.

[5] Estimates based upon reports collected from a selected list of representative manufacturing plants.

[6] Estimates based upon reports collected from a selected list of representative retailers. Includes some coal shipped by truck from mine to final destination.

[7] The total of classes shown approximates total consumption. The calculation of consumption from production, imports, exports, and changes in stocks is not as accurate as the "Total of classes shown" because certain significant items of stocks are not included in yearend stocks. These items are: Stocks on lake and tidewater docks, stocks at other intermediate storage piles between mine and consumer, and coal in transit.

[8] Canvass discontinued.

TABLE 62.—Fuel economy in consumption of coal at electric-utility powerplants in the United States

Year	Coal consumed per kilowatt-hour (pounds)	Index numbers based on 1919 as 100
1919	3.20	100.0
1920	3.00	93.8
1921	2.70	84.4
1922	2.50	78.1
1923	2.40	75.0
1924	2.20	68.8
1925	2.00	62.5
1926	1.90	59.4
1927	1.82	56.9
1928	1.73	54.1
1929	1.66	51.9
1930	1.60	50.0
1931	1.52	47.5
1932	1.49	46.6
1933	1.46	45.6
1934	1.45	45.3
1935	1.44	45.0
1936	1.44	45.0
1937	1.44	45.0
1938	1.40	43.8
1939	1.38	43.1
1940	1.34	41.9
1941	1.34	41.9
1942	1.30	40.6
1943	1.30	40.6
1944	1.29	40.3
1945	1.30	40.6
1946	1.29	40.3
1947	1.31	40.9
1948	1.30	40.6
1949	1.24	38.8
1950	1.19	37.2
1951	1.14	35.6
1952	1.10	34.4
1953	1.06	33.1
1954	.99	30.9
1955	.95	29.7
1956	.94	29.4
1957	.93	29.1
1958	.90	28.1
1959	.89	27.8
1960	.88	27.5
1961	.86	26.9

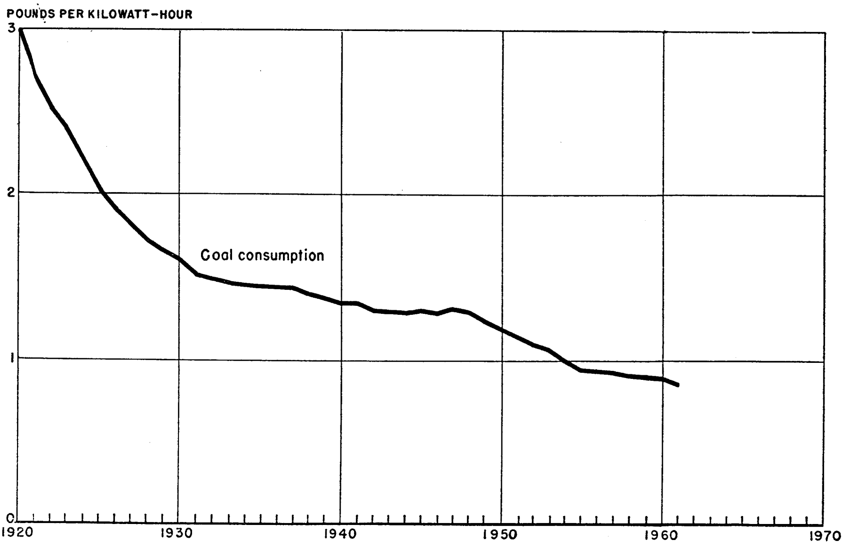

FIGURE 15.—Trend in fuel economy at electric-utility powerplants in the United States, 1920–61.

RELATIVE RATE OF GROWTH OF MINERAL FUELS AND WATERPOWER

Information on the trends in consumption of the various energy fuels and waterpower is presented in the Review of Mineral-Fuel Industries, Minerals Yearbook, volume 2, 1961.

STOCKS

The figures on stocks are based on complete coverage for all categories except "Other manufacturing and mining industries" and "Retail dealer stocks." Stocks for these two categories are based on samples, and the statistical procedure followed is that for calculating total consumption.

TABLE 63.—Stocks of bituminous coal and lignite in the hands of commercial consumers and in retail dealers' yards in the United States

Date	Total stocks (net tons)	Days' supply at current rate of consumption on date of stocktaking							
		Electric power utilities	Railroads (class I)	Manufacturing and mining industries				Retail dealers	Total
				Oven coke plants	Steel and rolling mills	Cement mills	Other manufacturing and mining industries		
1960									
Jan. 31	73, 426, 000	94	27	41	25	56	45	6	60
Feb. 29	70, 640, 000	89	24	39	24	53	43	5	56
Mar. 31	66, 955, 000	83	24	39	22	45	40	3	53
Apr. 30	68, 153, 000	102	29	42	33	40	49	8	66
May 31	71, 364, 000	110	36	49	42	39	54	13	74
June 30	73, 928, 000	110	48	58	41	44	56	19	79
July 31	70, 235, 000	110	49	57	44	47	61	20	82
Aug. 31	72, 662, 000	104	47	60	37	53	56	15	78
Sept. 30	74, 458, 000	112	44	65	38	55	56	12	81
Oct. 31	76, 206, 000	113	26	63	35	58	51	10	78
Nov. 30	76, 730, 000	107	31	68	27	58	47	9	75
Dec. 31	73, 244, 000	93	28	71	23	54	41	5	66
1961									
Jan. 31	69, 194, 000	86	(1)	66	20	55	40	4	62
Feb. 28	66, 463, 000	86	(1)	58	20	53	41	5	62
Mar. 31	65, 183, 000	94	(1)	57	22	47	42	5	66
Apr. 30	65, 007, 000	100	(1)	52	22	46	43	6	69
May 31	67, 893, 000	107	(1)	50	28	45	46	12	74
June 30	70, 698, 000	106	(1)	49	33	47	53	16	76
July 31	67, 139, 000	102	(1)	43	36	46	54	18	74
Aug. 31	69, 353, 000	98	(1)	44	34	55	51	11	70
Sept. 30	70, 697, 000	100	(1)	42	32	55	51	9	69
Oct. 31	72, 612, 000	102	(1)	44	29	55	47	7	67
Nov. 30	73, 851, 000	96	(1)	46	23	58	45	7	65
Dec. 31	71, 418, 000	89	(1)	44	20	51	41	4	59

[1] Canvass discontinued.

PRICES

TABLE 64.—Average value per ton, f.o.b. mines, of bituminous coal and lignite produced in the United States, by States

State	1960				1961			
	Underground	Strip	Auger	Total	Underground	Strip	Auger	Total
Alabama	$7.61	$5.06	$6.87	$7.10	$7.67	$4.79	$4.77	$7.04
Alaska	7.24	8.90	------	8.75	6.77	8.17	------	7.96
Arizona	10.50	------	------	10.50	------	------	------	------
Arkansas	8.43	7.30	------	7.61	8.10	6.75	------	7.31
Colorado	6.35	3.73	------	5.85	6.61	3.68	------	6.20
Georgia	5.00	------	------	5.00	5.00	------	------	5.00
Illinois	4.00	4.01	------	4.00	3.87	3.96	2.00	3.91
Indiana	4.29	3.82	------	3.96	4.14	3.79	------	3.89
Iowa	4.44	3.41	------	3.60	4.41	3.43	------	3.58
Kansas	7.58	4.71	------	4.73	4.67	4.67	------	4.67
Kentucky	4.69	3.34	3.07	4.22	4.52	3.36	3.09	4.06
Maryland	4.54	3.32	------	3.74	4.72	3.21	------	3.79
Missouri	5.04	4.28	------	4.31	5.43	4.25	------	4.28
Montana:								
Bituminous	6.90	6.58	------	6.87	6.78	6.43	------	6.76
Lignite	4.28	1.93	------	2.06	4.59	1.91	------	2.01
Total Montana	6.64	2.12	------	3.79	6.56	2.04	------	3.26
New Mexico	6.17	4.59	------	5.93	6.05	5.03	------	6.01
North Dakota (lignite)	4.71	2.29	------	2.29	4.78	2.25	------	2.25
Ohio	4.49	3.64	3.10	3.85	4.39	3.57	3.12	3.77
Oklahoma	9.02	6.29	------	6.79	8.93	6.18	------	6.58
Pennsylvania	6.07	3.68	3.23	5.29	5.98	3.60	3.15	5.17
South Dakota (lignite)	------	4.08	------	4.08	------	4.20	------	4.20
Tennessee	3.68	3.36	3.30	3.57	3.63	3.39	3.02	3.53
Utah	6.35	------	------	6.35	6.03	------	------	6.03
Virginia	4.50	3.17	3.23	4.41	4.25	2.98	2.88	4.16
Washington	7.38	9.75	------	7.54	7.15	9.71	------	7.24
West Virginia	5.14	3.66	3.67	5.02	5.05	3.55	3.53	4.94
Wyoming	7.04	2.80	------	3.45	6.93	2.91	------	3.39
Total	5.14	3.74	3.37	4.69	5.02	3.67	3.24	4.58

TABLE 65.—Production and average value per ton, f.o.b. mines, of bituminous coal and lignite sold in open market and not sold in open market, 1961, by States

State	Production					Average value per ton, f.o.b. mines		
	Sold in open market		Not sold in open market		Total (net tons)	Sold in open market	Not sold in open market	Total
	Net tons	Percentage of total	Net tons	Percentage of total				
Alabama	5,433,974	42.1	7,481,491	57.9	12,915,465	$5.83	$7.92	$7.04
Alaska	728,680	98.9	8,151	1.1	736,831	7.97	7.01	7.96
Arkansas	394,936	100.0	----------	--------	394,936	7.31	--------	7.31
Colorado	2,916,375	79.3	761,571	20.7	3,677,946	5.28	9.69	6.20
Georgia	4,426	100.0	----------	--------	4,426	5.00	--------	5.00
Illinois	45,245,563	100.0	----------	--------	45,245,563	3.91	--------	3.91
Indiana	15,100,142	100.0	6,033	--------	15,106,175	3.89	4.19	3.89
Iowa	927,156	100.0	----------	--------	927,156	3.58	--------	3.58
Kansas	660,218	99.5	3,540	.5	663,758	4.67	4.75	4.67
Kentucky	57,640,003	91.4	5,391,740	8.6	63,031,743	3.84	6.50	4.06
Maryland	757,373	100.0	----------	--------	757,373	3.79	--------	3.79
Missouri	2,937,983	100.0	----------	--------	2,937,983	4.28	--------	4.28
Montana:								
Bituminous	97,418	100.0	----------	--------	97,418	6.76	--------	6.76
Lignite	273,444	100.0	----------	--------	273,444	2.01	--------	2.01
Total Montana	370,862	100.0	----------	--------	370,862	3.26	--------	3.26
New Mexico	62,451	15.2	349,690	84.8	412,141	6.07	6.00	6.01
North Dakota (lignite)	2,638,354	96.8	87,916	3.2	2,726,270	2.27	1.70	2.25
Ohio	27,685 586	85.9	4,539,916	14.1	32,225,502	3.84	3.31	3.77
Oklahoma	900,857	87.3	130,683	12.7	1,031,540	6.19	9.24	6.58
Pennsylvania	38,756,723	61.9	23,895,372	38.1	62,652,095	4.31	5.52	5.17
South Dakota (lignite)	17,805	100.0	----------	--------	17,805	4.20	--------	4.20
Tennessee	5,773,439	98.5	86,249	1.5	5,859,688	3.53	3.32	3.53
Utah	2,426,318	47.0	2,732,927	53.0	5,159,245	4.85	7.09	6.03
Virginia	28,307,757	93.3	2,024.541	6.7	30,332,298	4.03	5.94	4.16
Washington	187,660	98.4	3,085	1.6	190,745	7.20	9.38	7.24
West Virginia	99,171,628	87.7	13,898,820	12.3	113,070,448	4.77	6.16	4.94
Wyoming	1,072,058	42.4	1,456,750	57.6	2,528,808	3.27	3.48	3.39
Total	340,118,327	84.4	62,858,475	15.6	402,976,802	4.25	6.35	4.58

LIGNITE

TABLE 66.—Summary of operations at lignite mines in the United States, 1961, by States [1]

Item	Montana	North Dakota	South Dakota	Total
UNDERGROUND MINES				
Number of mines	4	1		5
Shot from solid ... net tons	8,170	1,981		10,151
Cut by machines ... do	1,926			1,926
Total production ... do	10,096	1,981		12,077
Number of cutting machines	2			2
Average output per machine ... net tons	963			963
Underground production cut by machine ... percent	19.1			15.9
Average value per ton	$4.59	$4.78		$4.63
Average number of men working daily	13	2		15
Average number of days worked	130	123		131
Number of man-days worked	1,686	276		1,962
Average tons per man per day	5.99	7.19		6.16
STRIP MINES				
Number of mines	2	31	1	34
Production ... net tons	263,348	2,724,289	17,805	3,005,442
Average value per ton	$1.91	$2.25	$4.20	$2.23
Number of shovels and draglines	3	51	2	56
Average number of men working daily	16	328	8	352
Average number of days worked	225	204	186	205
Number of man-days worked	3,595	66,922	1,487	72,004
Average tons per man per day	73.25	40.71	11.97	41.74
TOTAL, ALL LIGNITE MINES				
Number of mines	6	32	1	39
Production (net tons):				
Shipped by rail [2]	262,175	1,925,124		2,187,299
Shipped by truck	11,241	441,256	17,555	470,052
Used at mines [3]	28	359,890	250	360,168
Total	273,444	2,726,270	17,805	3,017,519
Average value per ton	$2.01	$2.25	$4.20	$2.24
Average number of men working daily	29	330	8	367
Average number of days worked	182	204	186	202
Number of man-days worked	5,281	67,198	1,487	73,966
Average tons per man per day	51.78	40.57	11.97	40.80

---

[1] Exclusive of Texas (lignite).

[2] Includes coal loaded at mine directly into railroad cars and hauled by trucks to railroad sidings.

[3] Includes coal used at mine for power and heat, made into beehive coke at mine, used by mine employees, all other uses at mine, taken by locomotive tender, and transported from mine to point of use by conveyor or tram.

FOREIGN TRADE [7]

Imports of bituminous coal and lignite are very small. Exports have been an important item of foreign trade for many years, particularly since the close of World War II. See figure 16.

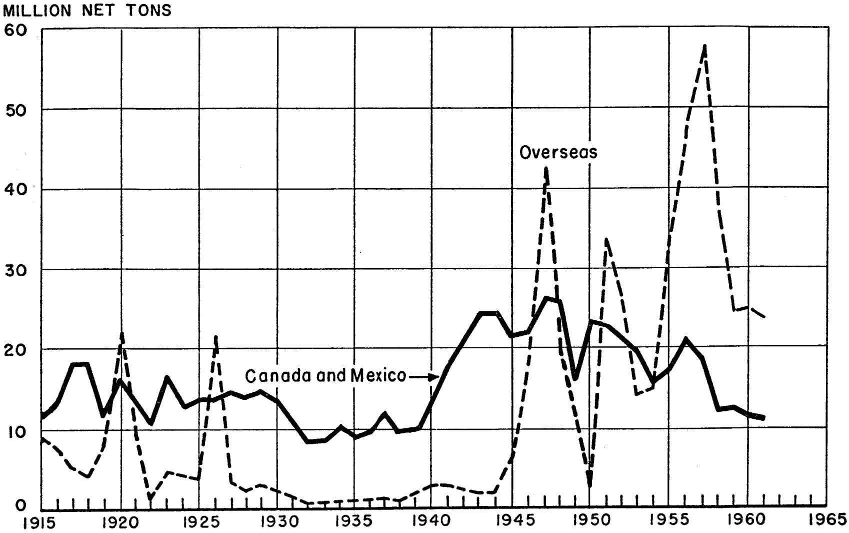

FIGURE 16.—Exports of bituminous coal and lignite from the United States to Canada and Mexico and overseas, 1915–61.

TABLE 67.—Bituminous coal[1] imported for consumption in the United States, by countries and customs districts

(Net tons)

Country and customs district	1959	1960	1961
Country:			
North America: Canada	374,713	260,372	164,125
Asia: Japan	------------	123	134
Total	374,713	260,495	164,259
Customs district:			
Alaska	30	20	10
Colorado	------------	------------	80
Dakota	------------	11	------------
Galveston	------------	51	------------
Los Angeles	------------	123	134
Maine and New Hampshire	114,095	115,779	136,732
Michigan	64	57	------------
Montana and Idaho	71,767	49,494	27,008
New York	------------	------------	295
Pittsburgh	------------	37	------------
Vermont	306	------------	------------
Washington	188,451	94,923	------------
Total	374,713	260,495	164,259

[1] Includes slack, culm, and lignite.

Source: Bureau of the Census.

---

[7] Figures on imports and exports compiled by M. B. Price and E. D. Page, of the Bureau of Mines, from records of the Bureau of the Census, U.S. Department of Commerce.

TABLE 68.—Exports of bituminous coal, by country groups

(Thousand net tons)

Year	Canada (including Newfoundland) and Mexico	Overseas (all other countries)								Grand total
		West Indies and Central America [1]	Miquelon, Bermuda, and Greenland	South America	Europe	Asia	Africa	Oceania	Total overseas	
1952–56 (average)	18,903	59	3	1,937	21,858	3,450	239	6	27,552	46,455
1957	18,493	35	4	2,269	49,701	5,673	271	----------	57,953	76,446
1958	12,272	34	1	1,452	32,889	3,550	95	----------	38,021	50,293
1959	12,459	17	(2)	1,499	19,128	4,077	73	----------	24,794	37,253
1960	11,696	18	2	2,178	[3] 16,936	5,654	57	----------	[3] 24,845	[3] 36,541
1961	11,223	3	3	1,786	15,275	6,617	63	(2)	23,747	34,970

---

[1] Includes Panama.
[2] Less than 1,000 tons.
[3] Revised figure.

Source: Bureau of the Census.

TABLE 69.—Bituminous coal exported from the United States, by countries [1]

(Net tons)

Country	1958	1959	1960	1961
North America:				
Bermuda	1,211	----------	----------	----------
Canada	12,238,179	12,406,800	[2] 11,638,739	11,169,056
Central America:				
Costa Rica	120	20	20	147
El Salvador	45	45	45	101
Guatemala	160	120	136	229
Honduras	65	170	135	450
Other Central America	25	25	52	87
Mexico	33,997	51,512	57,332	53,992
Miquelon	----------	643	2,328	2,813
West Indies:				
British:				
Barbados	537	----------	----------	----------
Jamaica	888	----------	----------	25
Trinidad and Tobago	653	2,549	2,129	466
Cuba	29,404	12,758	14,482	----------
Dominican Republic	218	226	59	355
French	988	521	588	906
Haiti	----------	150	----------	----------
Netherlands Antilles	----------	100	----------	----------
Total North America	12,306,490	12,475,639	[2] 11,716,045	11,228,627
South America:				
Argentina	216,186	397,786	680,546	576,990
Brazil	977,988	880,970	1,048,716	978,700
Chile	192,694	162,312	368,545	177,999
Uruguay	65,143	58,253	79,919	33,972
Venezuela	217	28	----------	16,970
Other South America	101	----------	34	1,337
Total South America	1,452,329	1,499,349	2,177,760	1,785,968

See footnotes at end of table.

TABLE 69.—Bituminous coal exported from the United States, by countries [1]—Continued

(Net tons)

Country	1958	1959	1960	1961
Europe:				
Austria	1,083,078	809,985	587,626	310,286
Belgium-Luxembourg	2,280,116	1,150,373	1,106,037	904,907
Czechoslovakia				39,617
Denmark	495,360	189,309	130,157	80,022
Finland	102,960	5,553		
France	3,000,913	1,042,303	[2] 732,319	643,729
Germany, West	9,708,332	4,463,301	4,565,556	4,215,941
Gibraltar	7,158			
Greece	74,129	20,763		
Ireland	516,970	417,365	[3] 207,787	195,255
Italy	6,989,027	5,200,296	4,845,814	4,728,556
Netherlands	5,515,399	3,288,234	2,785,484	2,447,480
Norway	214,799	110,969	76,932	50,918
Poland and Danzig	52,223			
Portugal	232,653	147,512	52,453	67,046
Spain	733,492	747,165	331,439	227,574
Sweden	788,379	749,546	645,193	820,136
Switzerland	421,038	262,668	[2] 322,815	70,494
Trieste	263,872	88,065	38,392	51,970
United Kingdom	20,156	24,499		
Yugoslavia	389,222	410,619	508,427	420,444
Total Europe	32,889,276	19,128,525	[2] 16,936,431	15,274,375
Asia:				
Indonesia	24,479	48,973	23,308	1,079
Japan	3,299,133	4,020,288	5,617,191	6,610,166
Korea, Republic of	225,877	7,318		
Turkey	6		11,814	
Viet-Nam				6,121
Other Asia	584	291	1,428	79
Total Asia	3,550,079	4,076,870	5,653,741	6,617,445
Africa:				
Angola	11,506		5,596	55
Canary Islands	9,192	2,799		
Libya	32,590	44,644	44,832	45,432
United Arab Republic (Egypt)	[4] 24,470	25,605	5,731	17,815
Other Africa	17,450		939	
Total Africa	95,208	73,048	57,098	63,302
Oceania: Australia				108
Grand total	50,293,382	37,253,431	[2] 36,541,075	34,969,825

---

[1] Amounts stated do not include fuel or bunker coal loaded on vessels engaged in foreign trade, which aggregated 358,519 tons in 1958, 365,806 tons in 1959, 307,812 tons in 1960, and 275,017 tons in 1961.
[2] Revised figure.
[3] Adjusted by the Bureau of Mines to include 63,571 tons credited to the United Kingdom by the Bureau of the Census.
[4] Effective July 1, 1958.

Source: Bureau of the Census.

TABLE 70.—Bituminous coal exported from the United States, by customs districts

(Net tons)

Customs district	1958	1959	1960	1961
North Atlantic:				
Maine and New Hampshire	1,893	5,933	2,120	2,459
Massachusetts	58	9,812	54	-----------
New York	656	9,835	12,255	5,448
Philadelphia	342,737	80,818	39,092	14,900
South Atlantic:				
Georgia	-----------	102	-----------	-----------
Maryland	3,452,683	1,586,620	1,471,576	1,160,824
Virginia	33,875,389	23,031,575	[1] 23,231,067	22,644,561
Gulf Coast:				
Florida	-----------	63	-----------	-----------
Galveston	278	559	45	1,092
Mobile	118,156	101,671	110,031	30,086
New Orleans	6,176	315	388	1,277
Sabine	-----------	-----------	2,440	-----------
Mexican border:				
Arizona	114	-----------	199	-----------
El Paso	24,632	51,005	56,802	55,353
Laredo	160	266	239	417
Pacific Coast:				
Los Angeles	-----------	-----------	60	-----------
Oregon	27,232	-----------	-----------	-----------
San Diego	-----------	2	92	-----------
San Francisco	191,558	-----------	-----------	81
Washington	33,160	1,231	8,254	820
Northern border:				
Buffalo	306,146	344,102	232,078	148,542
Chicago	157,384	112,298	40,412	33,079
Dakota	45,090	17,892	15,294	9,544
Duluth and Superior	70,489	21,420	12,139	6,516
Indiana	3,723	-----------	939	4,822
Michigan	831,930	566,843	349,790	271,739
Minnesota	701	223	-----------	-----------
Montana and Idaho	164	219	289	1,921
Ohio	8,652,892	9,420,259	[1] 9,312,614	9,061,261
Rochester	1,583,879	1,304,766	1,265,978	1,207,334
St. Lawrence	507,380	548,412	375,447	298,277
Vermont	43	115	55	141
Wisconsin	49	-----------	-----------	42
Miscellaneous:				
Kentucky	-----------	54	1,326	-----------
Pittsburgh	-----------	16,661	-----------	-----------
St. Louis	-----------	-----------	-----------	9,289
Total	[2] 50,293,382	[2] 37,253,431	[1] 36,541,075	34,969,825

[1] Revised figure.

[2] Includes 58,630 tons in 1958, and 20,360 tons in 1959, representing estimated data for which district breakdown is not available.

Source: Bureau of the Census.

TABLE 71.—Shipments of bituminous coal to possessions and other areas administered by the United States

(Net tons)

Territory	1959	1960	1961
Guam	1	2	4
Puerto Rico	1,051	1,499	1,659
Virgin Islands	-----------	2	4

Source: Bureau of the Census.

WORLD PRODUCTION

The United States supplied 420 million tons of bituminous coal, anthracite, and lignite, or 15 percent of the world output, in 1961.

World coal output decreased 1 percent, principally in the United States and Asia.

TABLE 72.—World production of bituminous coal, anthractie, and lignite, by countries [1]

(Thousand short tons)

Country	1957	1958	1959	1960	1961 [2]
North America:					
Canada:					
Bituminous	10,940	9,434	8,680	8,840	8,189
Lignite	2,249	2,253	1,948	2,170	2,209
Greenland: Bituminous	19	35	29	31	35
Mexico: Bituminous	1,566	1,621	1,748	1,958	2,004
United States:					
Anthracite (Pennsylvania)	25,338	21,171	20,649	18,817	17,446
Bituminous	490,097	408,019	409,248	412,766	399,959
Lignite	2,607	2,427	2,780	2,746	3,018
Total North America	532,816	444,960	445,082	447,328	432,860
South America:					
Argentina: Bituminous	230	288	331	309	371
Brazil: Bituminous (including lignite)	2,285	2,469	2,568	2,568	2,425
Chile: Bituminous (mined)	2,310	2,204	2,083	1,569	1,944
Colombia: Bituminous	2,205	2,690	2,756	2,866	2,756
Peru: Bituminous and anthracite	155	246	191	179	184
Venezuela: Bituminous	39	40	37	39	34
Total South America	7,224	7,937	7,966	7,530	7,714
Europe:					
Albania: Lignite	259	282	317	320	[3] 330
Austria:					
Bituminous	168	155	148	146	117
Lignite	7,581	7,158	6,857	6,584	6,240
Belgium: Bituminous and anthracite	31,968	29,831	25,085	24,763	23,742
Bulgaria:					
Bituminous and anthracite	424	419	551	628	650
Lignite	12,681	13,614	16,359	18,249	19,853
Czechoslovakia:					
Bituminous	26,655	26,380	27,694	28,896	28,867
Lignite	56,235	62,653	59,198	64,378	71,984
Denmark: Lignite	2,822	2,695	2,540	2,545	2,384
France:					
Bituminous and anthracite	62,610	63,632	63,501	61,685	57,715
Lignite	2,528	2,555	2,398	2,509	3,203
Germany:					
Bituminous and anthracite:					
East	3,035	3,201	3,132	2,999	2,950
West (including Saar)	166,206	165,286	157,237	157,911	158,309
Lignite:					
East	234,346	236,962	236,776	248,461	260,586
West	106,716	103,052	102,991	105,974	107,140
Pech coal: West	2,048	2,013	2,022	1,969	1,947
Greece: Lignite	1,100	1,315	1,774	2,812	2,778
Hungary:					
Bituminous	2,510	2,895	3,014	3,138	3,387
Lignite	20,861	23,826	24,927	26,098	27,672
Ireland: Bituminous and anthracite	266	225	257	259	224
Italy:					
Bituminous and anthracite	1,129	798	815	812	817
Lignite	434	916	1,347	875	1,661
Netherlands:					
Bituminous and anthracite	12,540	13,095	13,203	13,777	13,912
Lignite	317	281	219	4	---------
Poland:					
Bituminous	103,723	104,699	109,246	115,123	117,513
Lignite	6,563	8,313	10,205	10,281	11,396
Portugal:					
Anthracite	550	625	581	480	500
Lignite	203	172	175	172	174
Rumania:					
Bituminous and anthracite	277	330	330	330	330
Lignite	7,500	7,813	8,466	8,667	9,264
Spain:					
Bituminous and anthracite	15,356	15,922	14,926	15,193	15,185
Lignite	2,777	2,945	2,317	1,942	2,302
Svalbard (Spitsbergen): Bituminous:					
Controlled by Norway	423	317	278	443	398
Controlled by U.S.S.R	434	425	505	529	[3] 550
Sweden: Bituminous	335	352	300	272	220
Switzerland: Bituminous and anthracite (including lignite) [3]	11	11	11	11	11

See footnotes at end of table.

TABLE 72.—World production of bituminous coal, anthracite, and lignite, by countries [1]—Continued

(Thousand short tons)

Country	1957	1958	1959	1960	1961 [2]
Europe—Continued					
U.S.S.R.: [4]					
Bituminous and anthracite	362,111	389,148	402,586	413,292	415,483
Lignite	148,777	157,721	155,851	152,406	142,727
United Kingdom: Bituminous and anthracite	250,464	241,723	230,839	216,838	213,321
Yugoslavia:					
Bituminous	1,353	1,332	1,431	1,414	1,447
Lignite	18,497	19,597	21,836	23,623	25,089
Total Europe [4]	1,674,793	1,714,684	1,712,245	1,736,808	1,752,378
Asia:					
Afghanistan: Bituminous	30	37	40	52	58
Burma: Bituminous	1	----------	1	(5)	2
China: Bituminous, anthracite, and lignite	144,100	297,600	383,400	463,000	[3] 420,000
India: Bituminous	48,727	50,788	52,722	58,070	61,872
Indonesia: Bituminous	790	665	703	724	622
Iran: Bituminous [6]	194	214	257	254	220
Japan:					
Bituminous and anthracite	57,025	54,756	52,093	56,292	60,054
Lignite	1,832	1,744	1,619	1,552	1,443
Korea:					
North: Anthracite, bituminous, and lignite	5,494	7,586	9,760	11,707	12,996
Republic of: Anthracite	2,691	2,944	4,559	5,897	6,486
Malaya: Bituminous	171	75	85	8	----------
Outer Mongolia: Lignite and bituminous	450	521	665	682	826
Pakistan: Bituminous and lignite	578	669	820	915	1,015
Philippines: Bituminous	211	119	154	163	168
Ryukyu Islands: Bituminous	2	1	1	1	1
Taiwan: Bituminous	3,214	3,508	3,928	4,367	4,670
Thailand: Lignite	110	138	155	164	[3] 170
Turkey (mined):					
Bituminous	6,917	7,220	7,191	6,952	7,035
Lignite	4,009	4,212	4,038	3,760	4,159
Viet-Nam:					
North: Anthracite	1,200	1,980	2,427	2,682	[3] 2,900
South: Anthracite	13	22	22	30	[3] 33
Total Asia [4]	277,759	434,799	524,640	617,272	584,730
Africa:					
Algeria: Bituminous and anthracite	260	169	134	131	86
Congo, Republic of the (formerly Belgian): Bituminous	477	324	294	195	[3] 80
Malagasy, Republic of: Bituminous	1	----------	----------	----------	2
Morocco: Anthracite	574	562	513	454	452
Mozambique: Bituminous	298	273	283	287	354
Nigeria: Bituminous	913	1,036	831	629	669
Rhodesia and Nyasaland, Federation of: Southern Rhodesia: Bituminous	4,247	3,897	4,144	3,923	3,387
Swaziland: Anthracite and bituminous	----------	----------	1	13	1
Tanganyika: Bituminous	1	1	2	2	2
Union of South Africa: Bituminous and anthracite (marketable)	38,325	40,879	40,181	42,078	43,613
Total Africa	45,096	47,141	46,383	47,712	48,646
Oceania:					
Australia:					
Bituminous	22,310	22,895	22,734	25,285	27,012
Lignite	12,030	13,041	14,599	16,763	18,236
New Zealand:					
Bituminous and anthracite	931	939	941	896	844
Lignite	1,994	2,108	2,205	2,477	2,418
Total Oceania	37,265	38,983	40,479	45,421	48,510
Lignite (total of items shown above) (estimate)	655,478	678,314	682,562	706,214	727,262
Bituminous and anthracite (by subtraction)	1,919,475	2,010,190	2,094,233	2,195,857	2,147,576
World total, all grades (estimate)	2,574,953	2,688,504	2,776,795	2,902,071	2,874,838

[1] This table incorporates some revisions.
[2] Preliminary.
[3] Estimate.
[4] Output from U.S.S.R. in Asia (including Sakhalin) included with U.S.S.R. in Europe.
[5] Less than 500 tons.
[6] Year ended March 20 of year following that stated.

Compiled by Pearl J. Thompson, Division of Foreign Activities.

COAL TECHNOLOGY

Coal research by Government and industry continued as a means for improving the position of coal in the energy market. To supplement research by the Bureau of Mines, the Office of Coal Research of the Department of the Interior let its first coal research contract during 1961. The contract was awarded for a study of new products and methods which would provide for increased consumption of coal. The study is expected to provide basic information on which a broad program of research can be established. A Coal Research Bureau also was formed at West Virginia University to help expand markets and uses for coal produced in that State.

Advancement continued in mechanized mining that ranged from development of a "pushbutton" miner to devices that automatically direct the cutting machine through the coal seam. The world's largest coal auger, 7 feet in diameter, reached production rates as high as 25 tons of coal per minute. The auger drills holes to a depth of 216 feet at speeds up to 17 feet per minute. Much interest developed during the year in extending the possibilities of retreat longwall mining systems and equipment.

Hydraulic mining experiments by the Bureau of Mines as well as other organizations continued to use high-pressure jetstreams of water to break the coal from the face of the coal seam. Under certain conditions, increased productivity was achieved, compared with conventional mining.

Experiments with water infusion in the Pittsburgh bed of northern West Virginia showed the possibility of alleviating problems associated with methane emission during continuous mining.

Continuous methane-recording instruments that should be useful in studies of the rate of methane liberation and other ventilating problems in coal mines were designed. Satisfactory power shutoff devices also were developed to use equipment that continuously monitors the atmosphere near the working face.

Commercial feasibility was demonstrated for burning a coal-water slurry consisting of about 70 percent coal and 30 percent water; this demonstration pointed to possible use of coal-pipeline slurries as a source of energy for electric powerplant use. Research showed that, by proper size distribution, slurries containing 60 percent coal can be moved through pipelines satisfactorily. These slurries, upon storage in a tank after transport through a pipe, stabilize to form roughly a 70 to 30 mixture that can be pumped to a furnace. The key to direct use of such slurries is a cyclone furnace which dries, ignites, and burns each particle rapidly and only slightly decreases boiler efficiency. A hydraulic pipeline, designed by the Polish Central Mining Institute, is reported to successfully carry 2-inch coal over a distance of more than 100 miles.

Exploratory results for flow of coal-in-oil suspensions through 1-inch-diameter pipe showed that slurries containing up to 35 percent by weight of coal can be pumped at velocities up to 19 feet per second without causing pressure gradients appreciably greater than those found when pumping only oil. Even at a 70-percent concentration of coal, the slurry can be pumped without line blockage due to settling.

As the use of froth flotation for cleaning fine coal increases, the magnitude of the problem of dewatering tailings becomes greater. A report from Great Britain described new flocculation agents that provide settling rates of 2 feet per minute or more. As a result, settling is done in a simple cone, eliminating thickener and filter.

A new approach to froth flotation reverses the usual process. The raw feed is treated with potassium chlorate to render the coal surface easily wetted with water and causing the coal to sink and the shale and other impurities to be carried upward to the surface.

A contract for two giant boilers—the largest ever ordered—was awarded by the Tennessee Valley Authority. The boilers will serve two 900,000-kilowatt turbine generators. Each boiler will consume 315 tons of coal per hour and produce more than 6 million pounds of steam per hour at a pressure of 2,400 pounds per square inch and temperature of 1,050° F.

Experiments were conducted using modifications of chain-grate stoker furnaces as a means of preparing chemical coke for a variety of reduction processes. The furnaces take the coal feed, spread the coal to the desired depth, furnish the heat required using partial combustion, and discharge the coke continuously.

A new $2.5 million coke plant was erected in Wyoming to make coke from the region's coal. Results indicate that an industrial grade of coke can be produced that will support the burden in a reduction furnace.

As a means of decreasing the coke rate, experiments were conducted using natural gas, oil, coal, and mixtures of these as partial replacement of the coke required in blast furnaces. These supplemental fuels are injected through the tuyeres of the furnace. The use of oxygen as a replacement for at least part of the air used for combustion in the furnace also was investigated.

Efforts were continued in extending the use of fly ash from coal-fired powerplants. Fly ash finds considerable use as an ingredient in concrete, brick, and other construction materials.

Promising developments in new uses for coal were high-energy fuel prepared for supersonic jet aircraft, carbon disulfide for use in a variety of chemical processes, and a combination soil conditioner and fertilizer. Plans were announced for constructing a plant in Wyoming to make fertilizer from lignite. The humic acid part of the lignite will be combined with nitrogen and phosphate in a pelletized form.

Coal technology activities [illegible] the Bureau of Mines are reviewed in a separate report published annually.

Coal—Pennsylvania Anthracite

By Forrest T. Moyer,[1] J. A. Vaughan,[2] and Marian I. Cooke[3]

Contents

	Page
General summary	159
Scope of report	165
Acknowledgments	165
Production, mining methods, and equipment	166
Prices and values of sales	183
Employment	188
Distribution	189
Consumption	192
Stocks	195
Foreign trade	196
World production	197
Technology	198

GENERAL SUMMARY

Production of Pennsylvania anthracite in 1961 totaled 17.4 million net tons, a decline of 7 percent from 1960. As output from strip pits and dredges showed slight gains over 1960, the net decrease in production was attributable to a decline of 12 percent in underground output and 19 percent in the recovery of culm-bank coal.

The value of the 1961 output was $140.3 million, 5 percent less than in 1960. The greater proportional decline in production than in value resulted from a larger decrease in the aggregate shipments of Buckwheat No. 1 and smaller sizes than in the higher valued Pea and larger sizes. Total production of Pea and larger sizes declined 4 percent in 1961 and represented 42 percent of the industry's total shipments, compared with 40 percent in 1960. On the other hand, aggregate production of the lower valued sizes, Buckwheat No. 1 and smaller, declined 9 percent, representing 58 percent of total shipments compared with 60 percent in 1960. Another contributing factor was the increased value received for the larger sizes. The Pea and larger group averaged $10.80, or 38 cents per ton more than in 1960, but the Buckwheat No. 1 and smaller sizes averaged $6.09 per ton, or only 1 cent more. The average value received for all sizes by the industry in 1961 increased to $8.05 per ton or 22 cents higher than in 1960.

Demand for anthracite in the United States, as measured by apparent consumption, declined to 15.9 million tons, or 10 percent from 1960. Continued losses to competing fuels in the space-heating market were indicated since the weather was not a prominent factor in the reduced demand. According to the Anthracite Institute, heat demand (degree-days) in the primary anthracite market area was only slightly less than in 1960. Demand for anthracite for some industrial uses declined substantially. For example, the steel industry, owing to curtailed activity, required 14 percent less anthracite in 1961 for coke making, sintering, and other uses.

---

[1] Physical scientist.
[2] Commodity industry analyst.
[3] Commodity research assistant.

The downtrend in exports of anthracite, which had persisted since 1957, was reversed in 1961. Exports gained 7 percent, reaching 1.5 million tons for the year. Shipments to Canada dropped off 20 percent. However, these losses were more than offset by the nearly tripled tonnage exported to Western European countries. An outstanding feature of the export trade was the purchase of approximately 485,000 net tons of Stove and Egg sizes by the U.S. Army for use in military posts in Western Germany. As shipments were not begun until September, the effect of this movement will be reflected in the data for both 1961 and 1962.

Although the industry was active more days than in 1960, the labor force decreased 17 percent to an average of 15,792 men working daily because of mine closings and curtailed labor forces at other operations. As the reduced labor force worked an average of 196 days, 20 more than in 1960, the actual working time of slightly more than 3 million man-days was only 8 percent below 1960. The productivity rate advanced to a new record of 5.63 tons per man-day, compared with the former record of 5.60.

The overall injury experience of the industry in 1961, as judged by the combined fatal- and nonfatal-injury rate of 58.60 per million man-hours, was virtually unchanged from the preceding year. However, there were fewer injuries than in 1960 owing to reduced time of exposure to hazards. A total of 19 men, 16 less than in 1960, lost their lives in anthracite operations—a frequency rate of 0.85 per million man-hours. The number of nonfatal injuries declined from 1,401 in 1960 to 1,295 in 1961. Because of reduced working time, however, the frequency rate for nonfatal injuries rose from 57.30 in 1960 to 57.75 per million man-hours in 1961.

Salient annual data for 1957–61 are presented in table 1, and monthly trends in the Pennsylvania anthracite industry during 1961 are shown in table 2. Selected historical data are shown for 1925–61 in table 3.

TABLE 1.—Salient statistics of the Pennsylvania anthracite industry

	1957	1958	1959	1960	1961
Production:					
Preparation plants net tons	24,401,881	20,284,823	19,804,532	18,003,730	16,655,847
Dredges do	657,176	691,368	716,169	711,713	745,498
Used at collieries for power and heat net tons	279,264	194,951	128,585	101,998	45,094
Total production do	25,338,321	21,171,142	20,649,286	18,817,441	17,446,439
Value of production	$227,753,802	$187,898,316	$172,319,913	$147,116,250	$140,337,541
Average sales realization per net ton on preparation plant shipments (excludes dredge coal):					
Pea and larger	$12.47	$11.80	$11.04	$10.42	$10.80
Buckwheat No. 1 and smaller	$6.55	$6.80	$6.60	$6.27	$6.32
All sizes	$9.22	$9.14	$8.55	$8.01	$8.26
Percentage of total preparation plant shipments (excludes dredge coal):					
Pea and larger	45.0	46.7	43.8	42.0	43.4
Buckwheat No. 1 and smaller	55.0	53.3	56.2	58.0	56.6
Producers' stocks at end of year[1] net tons	499,620	406,375	429,020	199,356	232,520
Exports[2] do	4,331,785	2,279,859	1,787,558	[3] 1,440,400	1,546,488
Imports[2] do	1,138	4,363	2,633	1,476	792
Consumption (apparent) do	20,800,000	19,000,000	18,800,000	17,600,000	15,900,000
Average number of days worked	196	183	173	176	196
Average number of men working daily	30,825	26,540	23,294	19,051	15,792
Output per man per day net tons	4.18	4.36	5.12	5.60	5.63
Output per man per year do	819	798	886	986	1,103
Quantity cut by machines do	292,307	184,028	260,502	225,520	236,166
Quantity mined by stripping do	7,543,157	6,877,761	7,096,343	7,112,288	7,246,646
Quantity loaded by machines underground net tons	6,657,479	5,332,043	4,700,542	4,044,392	3,377,778
Distribution:					
Total receipts in New England[4] do	1,264,726	1,012,035	869,166	697,353	634,435
Exports to Canada[2] do	1,778,551	1,522,408	1,453,228	[3] 1,204,414	965,576
Loaded into vessels at Lake Erie[5] net tons	454,121	260,050	329,204	244,468	221,435
Receipts at Duluth-Superior[6]	260,931	93,499	71,846	[3] 65,713	33,475

[1] Anthracite Committee.

[2] U.S. Department of Commerce.

[3] Revised.

[4] Commonwealth of Massachusetts, Division on the Necessaries of Life, and Association of American Railroads.

[5] Ore and Coal Exchange, Cleveland, Ohio.

[6] Lake Superior Area Office, Corps of Engineers, U.S. Army, Duluth, Minn.

TABLE 2.—Statistical summary of monthly developments

(Net tons, except as

	January	February	March	April	May	June
Production (including mine fuel, local sales, and dredge coal)	1,767,000	1,721,000	1,438,000	1,173,000	1,418,000	1,344,000
Shipments (breakers and washeries only, all sizes):						
By rail [1]	862,253	795,020	557,507	540,682	647,969	788,826
By truck [2]	1,063,823	945,056	704,079	637,965	591,536	563,609
Carloadings [3]	17,214	16,393	12,996	12,192	14,202	15,929
Distribution:						
Lake Erie loadings [4]	----------	----------	----------	17,649	18,780	29,808
Lake Ontario loadings [5]	----------	----------	----------	----------	----------	----------
Receipts at Duluth-Superior [6]	----------	----------	----------	----------	----------	----------
Upper Lake dock trade: [8]						
Receipts:						
Lake Superior	----------	----------	60	----------	----------	----------
Lake Michigan	2,146	1,048	5,229	5,675	8,219	513
Deliveries (reloadings):						
Lake Superior	5,010	3,806	1,913	1,893	2,523	2,959
Lake Michigan	4,613	4,015	4,326	2,120	3,431	3,483
New England receipts: By rail [9]	58,797	64,666	36,125	18,339	56,041	76,562
Exports [10]	134,257	89,089	106,911	11,768	94,809	159,112
Imports [10]	123	----------	51	125	----------	----------
Industrial consumption and stocks by:						
Electric utilities: [11]						
Consumption	229,066	208,212	223,465	204,273	213,962	204,072
Stocks	1,757,409	1,660,615	1,616,441	1,594,033	1,568,727	1,559,511
Coke Plants:						
Used for carbonizing	25,308	23,113	23,638	25,157	26,950	26,109
Stocks	74,624	62,092	50,036	51,222	54,241	57,494
Stocks on Upper Lake docks: [8]						
Lake Superior	45,588	41,757	39,898	38,068	35,545	32,586
Lake Michigan	21,227	18,260	19,163	23,350	28,138	25,168
Producers' stocks [12]	110,342	64,179	98,032	152,598	246,939	178,019
Stocks in retail dealer yards [13]	599,000	554,000	463,000	435,000	534,000	676,000
Retail dealer deliveries [13]	787,000	646,000	500,000	316,000	274,000	303,000
Wholesale price indexes (1947—49=100): F.o.b. mines: [14]						
Chestnut	126.6	126.6	126.6	126.6	105.1	105.1
Pea	124.2	124.2	124.2	124.2	106.1	106.1
Buckwheat No. 1	161.9	161.9	161.9	161.9	138.0	138.0
Buckwheat No. 3	196.9	196.9	196.9	196.9	192.7	192.7
Employee wages and hours: [15]						
Average weekly earnings	$107.90	$106.19	$90.58	$84.86	$90.12	$91.19
Average hourly earnings	$2.81	$2.87	$2.68	$2.72	$2.69	$2.69
Average number of hours worked per week	38.4	37.0	33.8	31.2	33.5	33.9

[1] Furnished by Anthracite Institute.

[2] Pennsylvania Department of Mines and Mineral Industries.

[3] Association of American Railroads.

[4] Ore and Coal Exchange, Cleveland, Ohio.

[5] Buffalo Branch, Ore and Coal Exchange, Cleveland, Ohio.

[6] Lake Superior Area Office, Corps of Engineers, U. S. Army, Duluth, Minn.

[7] Revised.

[8] Includes all commercial docks on Lake Superior and west shore of Lake Michigan as far south as Kenosha. Data supplied by Upper Lake Docks Coal Bureau, Inc., and direct reports to the Bureau of Mines.

[9] Furnished by Commonwealth of Massachusetts, Division on the Necessaries of Life.

in the Pennsylvania anthracite industry in 1961

otherwise indicated)

July	August	September	October	November	December	Year 1961	Change from 1960 (percent)	Year 1960
1,178,000	1,533,000	1,394,000	1,603,000	1,501,000	1,376,000	17,446,000	−7.3	18,817,000
571,321	849,557	763,730	950,329	900,143	844,448	9,071,785	−6.9	9,740,088
473,833	594,623	560,028	735,212	781,465	991,322	8,642,551	−0.4	8,668,416
12,544	17,408	15,594	19,457	17,551	15,484	186,964	−9.2	205,865
23,263	26,971	38,473	27,340	39,151	-----------	221,435	−9.4	244,468
-----------	2,495	4,884	11,997	-----------	-----------	19,376	−60.0	48,460
-----------	7,100	10,874	-----------	15,501	-----------	33,475	−49.1	[7] 65,713
6,512	12,315	5,215	53	2,553	-----------	26,708	−56.0	60,653
217	225	426	958	853	1,441	26,950	−37.3	42,986
1,575	2,679	9,113	7,590	10,371	5,088	54,520	−14.7	63,929
3,137	1,369	2,159	3,238	1,940	2,025	35,856	−18.2	43,847
45,214	59,169	50,633	57,315	61,585	49,989	634,435	−9.0	697,353
93,228	141,814	150,539	141,112	223,562	200,287	1,546,488	+7.4	[7] 1,440,400
-----------	108	-----------	-----------	-----------	385	792	−46.3	1,476
201,132	205,680	210,847	204,373	203,154	200,917	2,509,153	−8.8	2,751,456
1,529,265	1,517,975	1,509,500	1,521,786	1,518,621	1,459,790	1,459,790	−18.8	1,798,787
25,337	26,032	27,341	28,381	30,699	32,060	320,125	−13.6	370,262
58,947	59,811	73,292	98,923	109,281	98,381	98,381	+6.0	92,848
37,523	47,188	43,250	35,571	27,733	22,628	22,628	−55.2	50,490
22,248	21,104	19,371	17,091	16,004	15,420	15,420	−34.9	23,694
172,601	252,901	293,176	297,453	275,727	232,520	232,520	+16.6	199,356
706,000	773,000	789,000	774,000	778,000	715,000	715,000	−1.9	729,000
231,000	290,000	312,000	474,000	410,000	527,000	5,070,000	−25.2	6,775,000
109.4	109.4	113.7	117.4	117.4	122.3	117.2	−4.3	122.5
108.7	108.7	110.9	113.2	113.2	118.0	115.1	−6.7	123.3
141.2	141.2	144.4	147.0	147.0	154.4	149.9	−6.1	159.6
192.7	192.7	197.8	197.8	197.8	197.8	195.8	+0.3	195.3
$106.26	$91.12	(15)	(15)	(15)	(15)	[16] $96.03	(17)	$89.81
$2.69	$2.72	(15)	(15)	(15)	(15)	[16] $2.73	(17)	$2.76
39.5	33.5	(15)	(15)	(15)	(15)	[16] 35.1	(17)	32.6

---

[10] U.S. Department of Commerce.
[11] Federal Power Commission.
[12] Anthracite Committee. Represents coal in ground storage on nearest available date to end of month.
[13] Estimated from reports submitted by a selected list of retail dealers. Does not include local sales.
[14] Bureau of Labor Statistics. Based on data obtained from authorized trade publications.
[15] Bureau of Labor Statistics. This series discontinued with August 1961.
[16] 8-month average.
[17] Not available.

TABLE 3.—Statistical trends in the Pennsylvania anthracite industry

	Production (net tons)	Value of production	Average value per net ton	Exports[1] (net tons)	Imports[1] (net tons)	Apparent consumption (net tons)	Average number of employees	Average number of days worked	Average tons per man per day	Average tons per man per year	Quantity cut by machines (net tons)	Quantity produced by stripping (net tons)	Quantity loaded mechanically underground[2] (net tons)
1925	61,817,149	$327,664,512	$5.30	3,179,006	382,894	64,061,000	160,312	182	2.12	386	941,189	1,578,478	------------
1926	84,437,452	474,164,252	5.62	4,029,683	813,956	77,221,000	165,386	244	2.09	511	931,650	2,401,356	------------
1927	80,095,564	420,941,726	5.26	3,325,507	119,030	74,672,000	165,259	225	2.15	485	1,171,888	2,153,156	[3] 2,223,281
1928	75,348,069	393,637,690	5.22	3,336,272	384,707	73,650,000	160,681	217	2.17	469	1,289,809	2,422,924	[3] 2,351,074
1929	73,828,195	385,642,751	5.22	3,406,369	487,172	71,457,000	151,501	225	2.16	487	1,159,910	1,911,766	3,470,158
1930	69,384,837	354,574,191	5.11	2,551,659	674,812	67,628,000	150,804	208	2.21	460	1,410,123	2,536,288	4,467,750
1931	59,645,652	296,354,586	4.97	1,778,308	637,951	58,408,000	139,431	181	2.37	428	1,587,265	3,813,237	4,384,780
1932	49,855,221	222,375,129	4.46	1,303,355	607,097	50,500,000	121,243	162	2.54	411	1,674,223	3,980,973	5,433,340
1933	49,541,344	206,718,405	4.17	1,034,562	456,252	49,600,000	104,633	182	2.60	473	1,648,249	4,932,069	6,557,267
1934	57,168,291	244,152,245	4.27	1,297,610	478,118	55,500,000	109,050	207	2.53	524	1,981,088	5,798,138	9,284,486
1935	52,158,783	210,130,565	4.03	1,608,549	571,439	51,100,000	103,269	189	2.68	505	1,848,095	5,187,072	9,279,057
1936	54,579,535	227,003,538	4.16	1,678,024	614,639	53,200,000	102,081	192	2.79	535	2,162,744	6,203,267	10,827,946
1937	51,856,433	197,598,849	3.81	1,914,173	395,737	50,400,000	99,085	189	2.77	523	1,984,512	5,696,018	10,683,837
1938	46,099,027	180,600,167	3.92	1,908,911	362,895	45,200,000	96,417	171	2.79	478	1,588,407	5,095,341	10,151,669
1939	51,487,377	187,175,324	3.64	2,590,000	298,153	49,700,000	93,138	183	3.02	553	1,881,884	5,486,479	11,773,833
1940	51,484,640	205,489,814	3.99	2,667,632	135,436	49,000,000	91,313	186	3.02	562	1,816,483	6,352,700	12,326,000
1941	[4] 56,368,267	240,275,126	4.26	3,380,189	74,669	52,700,000	88,054	203	[5] 3.04	617	1,855,422	7,316,574	13.441,987
1942	[4] 60,327,729	271,673,380	4.50	4,438,588	140,115	56,500,000	82,121	239	[5] 2.95	705	2,285,640	9,070,933	14,741,459
1943	[4] 60,643,620	306,816,018	5.06	4,138,680	166,020	57,100,000	79,153	270	[5] 2.78	751	1,624,883	8,989,387	14,745,793
1944	[4] 63,701,363	354,582,884	5.57	4,185,933	11,847	59,400,000	77,591	292	[5] 2.79	815	1,336,082	10,953,030	14,975,146
1945	[4] 54,933,909	323,944,435	5.90	3,691,247	149	51,600,000	72,842	269	[5] 2.79	751	1,210,171	10,056,325	13,927,955
1946	[4] 60,506,873	413,417,070	6.83	6,497,245	9,556	53,900,000	78,145	271	[5] 2.84	770	1,232,828	12,858,930	15,619,162
1947	[4] 57,190,009	413,019,486	7.22	8,509,995	10,350	48,200,000	78,600	259	[5] 2.78	720	1,209,983	12,603,545	16,054,011
1948	[4] 57,139,948	467,051,800	8.17	6,675,914	945	50,200,000	76,215	265	[5] 2.81	745	1,016,757	13,352,874	15,742,368
1949	[4] 42,701,724	358,008,451	8.38	4,942,670	----------	37,700,000	75,377	195	[5] 2.87	560	557,599	10,376,808	11,858,088
1950	[4] 44,076,703	392,398,006	8.90	3,891,569	18,289	39,900,000	72,624	211	[5] 2.83	597	611,734	11,833,934	12,335,650
1951[6]	42,669,997	405,817,963	9.51	5,955,535	26,812	37,000,000	68,995	208	2.97	618	496,085	11,135,990	10,847,787
1952	40,582,558	379,714,076	9.36	4,592,060	29,370	35,300,000	65,923	201	3.06	615	386,128	10,696,705	10,034,464
1953	30,949,152	299,139,687	9.67	2,724,270	31,443	28,000,000	57,862	163	3.28	535	318,699	8,606,482	6,838,769
1954	29,083,477	247,870,023	8.52	2,851,239	5,831	26,900,000	43,996	164	4.02	659	381,424	7,939,680	6,978,035
1955	26,204,554	206,096,662	7.86	3,152,313	170	23,600,000	[7] 33,523	[7] 197	[7] 3.96	[7] 780	393,932	7,703,907	6,660,939
1956	28,900,220	236,785,062	8.19	5,244,349	46	24,000,000	31,516	216	4.25	918	400,402	8,354,230	7,308,110
1957	25,338,321	227,753,802	8.99	4,331,785	1,138	20,800,000	30,825	196	4.18	819	292,307	7,543,157	6,657,479
1958	21,171,142	187,898,316	8.88	2,279,859	4,363	19,000,000	26,540	183	4.36	798	184,028	6,877,761	5,332,043
1959	20,649,286	172,319,913	8.35	1,787,558	2,633	18,800,000	23,294	173	5.12	886	260,502	7,096,343	4,700,542
1960	18,817,441	147,116,250	7.82	[8] 1,440,400	1,476	17,600,000	19,051	176	5.60	986	225,520	7,112,288	4,044,392
1961	17,446,439	140,337,541	8.04	1,546,488	792	15,900,000	15,792	196	5.63	1,103	236,166	7,246,646	3,377,778

---

[1] U.S. Department of Commerce.

[2] Data first collected in 1929.

[3] As reported by the Commonwealth of Pennsylvania, Department of Mines.

[4] Includes some "bootleg" coal purchased by authorized operators and prepared at their breakers.

[5] Output per man calculated on authorized tonnages only; bootleg purchases excluded.

[6] Figures for 1951 and subsequent years are not strictly comparable with previous years. See Production and Employment sections, Coal—Pennsylvania Anthracite, Minerals Yearbook 1951.

[7] Estimated.

[8] Revised.

SCOPE OF REPORT

The data in this chapter relate only to the anthracite or hard coal produced in the Commonwealth of Pennsylvania. Geologically, the anthracite region of Pennsylvania is divided into four producing fields: The Northern, Eastern Middle, Western Middle, and the Southern. The area is also divided by coal-trade usage into three regions: Wyoming, Lehigh, and Schuylkill. The production of anthracitic coal in the States of Arkansas, Colorado, New Mexico, Virginia, and Washington is included with bituminous coal in the Bituminous Coal and Lignite chapter of the Minerals Yearbook.

Bureau production statistics are compiled almost entirely from reports submitted voluntarily by preparation plants and dredges, as only a small part of the yearly output is marketed without preparation. However, questionnaires are sent to operators of underground mines, strip pits, and culm or silt banks to obtain data on run-of-mine production, names of preparation plants to which the raw coal is shipped for cleaning and sizing, number and type of equipment used, and other data. From information submitted by producers of run-of-mine coal, the Bureau is able to trace the production to counties, fields, and regions of origin. Also, by cross-checking these reports with those of the preparation plants, duplicate reporting is eliminated, and maximum coverage is obtained. Unreported production (usually less than 2 percent) is estimated by the Bureau from data released by the Anthracite Committee and the Pennsylvania Department of Mines and Mineral Industries.

Beginning with calendar year 1961, the commercial production data are presented by originating carrier method (rail and truck) rather than as "local sales" and shipments to points outside the producing region. This change, therefore, terminates the comparability of the foregoing data. Since 1956, data on employment in the anthracite industry have been compiled from the Bureau of Mines questionnaire, Mine Injuries and Employment—Pennsylvania Anthracite, to ease the reporting burden of respondents. The Bureau employment data include production, development, maintenance, repair, supervisory and technical personnel, and owners or firm members who actually produce coal, but exclude sales and office personnel and others not engaged in producing anthracite.

Data on the distribution of Pennsylvania anthracite are collected by the Bureau from producers, wholesalers, sales agents, and dock operators on the basis of the coal year (April 1–March 31). The distribution studies, which are published as Mineral Market Reports, present data on shipments by sizes and method of movement to selected cities in the United States and Canada. Copies may be obtained by writing to the Bureau of Mines, U.S. Department of the Interior, Washington 25, D.C.

ACKNOWLEDGMENTS

The Bureau canvasses of the Pennsylvania anthracite mining industry are restricted to data on production, distribution, employment, f.o.b. preparation plant value, equipment, injuries, and retail-dealer stocks and deliveries; therefore, data obtained from other sources were used freely in preparing this chapter. Although each source has been acknowledged by textual or footnote reference, the Bureau would like to express its gratitude particularly to the Pennsylvania Department of Mines and Mineral Industries, the Anthracite Committee, the Anthracite Institute, the Association of American Railroads, the Ore and Coal Exchange, Commonwealth of Massachusetts, and the Upper Lake Docks Coal Bureau, Inc. Sincere thanks are extended also to the anthracite producers who voluntarily submit annual reports to the Bureau. Without their cooperation, it would have been impossible to prepare this chapter.

The basic production data for 1961 were collected and tabulated by Ruth A. Cooper and Kathryn S. Huling of the Anthracite Research Center, Schuylkill Haven, Pa., C. S. Kuebler, Research Director.

PRODUCTION, MINING METHODS, AND EQUIPMENT

Production of Pennsylvania anthracite totaled 17.4 million net tons in 1961, a decline of approximately 1.4 million, or 7 percent from 1960. As in recent years, the percentage of annual output obtained from underground mines again declined because of industry efforts to concentrate production at lower cost operations. Of the 1961 total, underground mining supplied only 39 percent, compared with 41 percent in 1960 and 51 percent as recently as 1958. Output from strip pits increased 2 percent over 1960, reaching 42 percent of the year's production compared with 38 percent in 1960. However, the tonnage recovered from culm and silt banks decreased substantially, amounting to only 15 percent of the total compared with 17 percent in 1960. Dredge production increased slightly on a quantitative basis, but equalled only 4 percent of total production, the same as in 1960.

Despite a sharp decline in underground, dredge, and culm-bank production, the Lehigh region was the only one to show an increase over 1960 (5 percent), owing to a gain of more than 447,000 tons in stripped coal. In the Schuylkill, where, regionally, the smallest drop occurred in underground production and dredge output increased, total production declined 7 percent because of relatively large decreases in culm-bank and strip-pit output. In the Wyoming region, where 1961 production was marked by substantial losses in both underground and culm-bank recovery, total output declined 13 percent. On a regional basis, the 1961 production was divided as follows: Lehigh, 17 percent—up 2 points from 1960; Schuylkill, 51 percent—the same as in 1960; and the Wyoming, 32 percent—down 2 points.

Production of individual sizes was in direct contrast to 1960 when the demand for smaller sizes was firmer than for the larger sizes. In 1961, for example, output of Pea and larger fell only 4 percent, compared with a decline of 9 percent for Buckwheat No. 1 and smaller. Egg and Buckwheat No. 4 were the only sizes to show a gain in 1961, the former almost doubled because of heavy last-quarter shipments to American armed forces in West Germany; and Buckwheat No. 4 increased only 1 percent. Data on the production of anthracite, by individual sizes and in percent of total, are presented in tables 4–6. Regional production for the period 1935–61 is shown in figure 1.

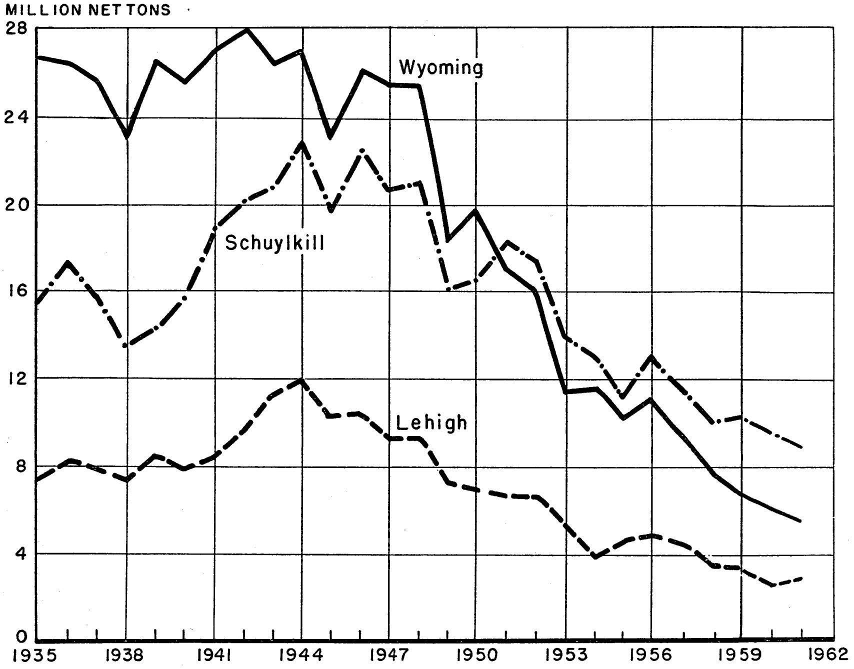

FIGURE 1.—Pennsylvania anthracite shipped from the Lehigh, Schuylkill, and Wyoming regions 1935–61.

Each of the major anthracite-producing counties showed production losses in 1961; output in Lackawanna County declined 37 percent; followed by Northumberland, 19 percent; Carbon, 17 percent; and Dauphin, 16 percent. In the two leading producing counties, Schuylkill and Luzerne, however, output was remarkably firm, dropping about 1 percent from the 1960 level. Data on production by counties, regions, and fields are included in tables 7–9.

TABLE 4.—Commercial production of Pennsylvania anthracite in 1961, by regions and sizes

Size	From preparation plant								
	Lehigh region			Schuylkill region			Wyoming region [1]		
	Rail	Truck	Total	Rail	Truck	Total	Rail	Truck	Total
NET TONS									
Lump [2] and Broken	426	111	537	2,056	1,539	3,595	2,952	2,494	5,446
Egg	42,655	8,367	51,022	39,182	9,223	48,405	95,991	9,391	105,382
Stove	244,699	92,650	337,349	471,836	516,868	988,704	625,098	217,819	842,917
Chestnut	204,349	256,869	461,218	442,119	857,241	1,299,360	617,852	496,329	1,114,181
Pea	81,457	243,768	325,225	263,336	587,202	850,538	178,340	620,795	799,135
Total Pea and larger	573,586	601,765	1,175,351	1,218,529	1,972,073	3,190,602	1,520,233	1,346,828	2,867,061
Buckwheat No. 1	117,900	239,601	357,501	381,462	584,823	966,285	269,531	560,032	829,563
Buckwheat No. 2 (Rice)	71,096	188,226	259,322	267,209	491,974	759,183	175,688	340,463	516,151
Buckwheat No. 3 (Barley)	123,895	172,835	296,730	420,670	568,128	988,798	388,013	232,505	620,518
Buckwheat No. 4	214,300	45,147	259,447	355,605	240,532	596,137	108,905	58,063	166,968
Buckwheat No. 5	293,342	29,027	322,369	679,594	208,577	888,171	159,011	78,619	237,630
Other [3]	25,356	205,359	230,715	444,587	412,309	856,896	11,700	258,749	270,449
Total Buckwheat No. 1 and smaller	845,889	880,195	1,726,084	2,549,127	2,506,343	5,055,470	1,112,848	1,528,431	2,641,279
Grand total	1,419,475	1,481,960	2,901,435	3,767,656	4,478,416	8,246,072	2,633,081	2,875,259	5,508,340
VALUE									
Lump [2] and Broken	$4,810	$1,253	$6,063	$22,010	$17,390	$39,400	$33,889	$28,754	$62,643
Egg	462,939	87,767	550,706	408,169	94,824	502,993	1,063,561	103,779	1,167,340
Stove	2,708,628	1,050,644	3,759,272	5,066,405	5,503,914	10,570,319	7,214,077	2,535,992	9,750,069
Chestnut	2,317,389	2,997,241	5,314,630	4,799,832	9,234,329	14,034,161	7,243,299	6,076,994	13,320,293
Pea	728,715	2,270,345	2,999,060	2,220,007	5,143,652	7,363,659	1,714,565	6,974,254	8,688,819
Total Pea and larger	6,222,481	6,407,250	12,629,731	12,516,423	19,994,109	32,510,532	17,269,391	15,719,773	32,989,164
Buckwheat No. 1	969,075	1,975,905	2,944,980	2,996,674	4,722,878	7,719,552	2,242,446	5,508,003	7,750,449
Buckwheat No. 2 (Rice)	588,286	1,743,310	2,331,596	2,069,154	3,958,918	6,028,072	1,514,252	3,254,951	4,769,203
Buckwheat No. 3 (Barley)	837,796	1,206,326	2,044,122	2,847,687	3,696,099	6,543,786	2,729,979	1,706,919	4,436,898
Buckwheat No. 4	1,036,987	227,883	1,264,870	1,718,662	1,119,648	2,838,310	556,141	303,947	860,088
Buckwheat No. 5	1,407,909	106,516	1,514,425	2,905,055	830,853	3,735,908	791,602	372,786	1,164,388
Other [3]	109,950	319,759	429,709	1,266,439	1,295,308	2,561,747	19,305	570,158	589,463
Total Buckwheat No. 1 and smaller	4,950,003	5,579,699	10,529,702	13,803,671	15,623,704	29,427,375	7,853,725	11,716,764	19,570,489
Grand total	11,172,484	11,986,949	23,159,433	26,320,094	35,617,813	61,937,907	25,123,116	27,436,537	52,559,653

AVERAGE VALUE PER TON									
Lump [2] and Broken	$11.29	$11.29	$11.29	$10.71	$11.30	$10.96	$11.48	$11.53	$11.50
Egg	10.85	10.49	10.79	10.42	10.28	10.39	11.08	11.05	11.08
Stove	11.07	11.34	11.14	10.74	10.65	10.69	11.54	11.64	11.57
Chestnut	11.34	11.67	11.52	10.86	10.77	10.80	11.72	12.24	11.96
Pea	8.95	9.31	9.22	8.43	8.76	8.66	9.61	11.23	10.87
Total Pea and larger	10.85	10.65	10.75	10.27	10.14	10.19	11.36	11.67	11.51
Buckwheat No. 1	8.22	8.25	8.24	7.86	8.08	7.99	8.32	9.84	9.34
Buckwheat No. 2 (Rice)	8.27	9.26	8.99	7.74	8.05	7.94	8.62	9.56	9.24
Buckwheat No. 3 (Barley)	6.76	6.98	6.89	6.77	6.51	6.62	7.04	7.34	7.15
Buckwheat No. 4	4.84	5.05	4.88	4.83	4.65	4.76	5.11	5.23	5.15
Buckwheat No. 5	4.80	3.67	4.70	4.27	3.98	4.21	4.98	4.74	4.90
Other [3]	4.34	1.56	1.86	2.85	3.14	2.99	1.65	2.20	2.18
Total Buckwheat No. 1 and smaller	5.85	6.34	6.10	5.42	6.23	5.82	7.06	7.67	7.41
Grand total	7.87	8.09	7.98	6.99	7.95	7.51	9.54	9.54	9.54

See footnotes at end of table.

TABLE 4.—Commercial production of Pennsylvania anthracite in 1961, by regions and sizes—Continued

Size	Total preparation plants			From river dredging			Total		
	Rail	Truck	Total	Rail	Truck	Total	Rail	Truck	Total
NET TONS									
Lump [2] and Broken	5,434	4,144	9,578	------	------	------	5,434	4,144	9,578
Egg	177,828	26,981	204,809	------	------	------	177,828	26,980	204,809
Stove	1,341,633	827,337	2,168,970	------	------	------	1,341,633	827,337	2,168,970
Chestnut	1,264,320	1,610,439	2,874,759	------	94	94	1,264,320	1,610,533	2,874,853
Pea	523,133	1,451,765	1,974,898	------	375	375	523,133	1,452,140	1,975,273
Total Pea and larger	3,312,348	3,920,666	7,233,014	------	469	469	3,312,348	3,921,135	7,233,483
Buckwheat No. 1	768,893	1,384,456	2,153,349	------	1,088	1,088	768,893	1,385,544	2,154,437
Buckwheat No. 2 (Rice)	513,993	1,020,663	1,534,656	------	1,211	1,211	513,993	1,021,874	1,535,867
Buckwheat No. 3 (Barley)	932,578	973,468	1,906,046	2,844	6,124	8,968	935,422	979,592	1,915,014
Buckwheat No. 4	678,810	343,742	1,022,552	2,738	36,622	39,360	681,548	380,364	1,061,912
Buckwheat No. 5	1,131,947	316,223	1,448,170	3,829	26,000	29,829	1,135,776	342,223	1,477,999
Other [3]	481,643	876,417	1,358,060	542,174	122,399	664,573	1,023,817	998,816	2,022,633
Total Buckwheat No. 1 and smaller	4,507,864	4,914,969	9,422,833	551,585	193,444	745,029	5,059,449	5,108,413	10,167,862
Grand total	7,820,212	8,835,635	16,655,847	551,585	193,913	745,498	8,371,797	9,029,548	17,401,345
VALUE									
Lump [2] and Broken	$60,709	$47,397	$108,106	------	------	------	$60,709	$47,397	$108,106
Egg	1,934,669	286,370	2,221,039	------	------	------	1,934,669	286,370	2,221,039
Stove	14,989,110	9,090,550	24,079,660	------	------	------	14,989,110	9,090,550	24,079,660
Chestnut	14,360,520	18,308,564	32,669,084	------	$847	$847	14,360,520	18,309,411	32,669,931
Pea	4,663,287	14,388,251	19,051,538	------	2,475	2,475	4,663,287	14,390,726	19,054,013
Total Pea and larger	36,008,295	42,121,132	78,129,427	------	3,322	3,322	36,008,295	42,124,454	78,132,749
Buckwheat No. 1	6,208,195	12,206,786	18,414,981	------	5,801	5,801	6,208,195	12,212,587	18,420,782
Buckwheat No. 2 (Rice)	4,171,692	8,957,179	13,128,871	------	8,349	8,349	4,171,692	8,965,528	13,137,220
Buckwheat No. 3 (Barley)	6,415,462	6,609,344	13,024,806	$18,486	25,338	43,824	6,433,948	6,634,682	13,068,630
Buckwheat No. 4	3,311,790	1,651,478	4,963,268	13,690	145,559	159,249	3,325,480	1,797,037	5,122,517
Buckwheat No. 5	5,104,566	1,310,155	6,414,721	14,359	92,599	106,958	5,118,925	1,402,754	6,521,679
Other [3]	1,395,694	2,185,225	3,580,919	1,636,737	390,374	2,027,111	3,032,431	2,575,599	5,608,030
Total Buckwheat No. 1 and smaller	26,607,399	32,920,167	59,527,566	1,683,272	668,020	2,351,292	28,290,671	33,588,187	61,878,858
Grand total	62,615,694	75,041,299	137,656,993	1,683,272	671,342	2,354,614	64,298,966	75,712,641	140,011,607

AVERAGE VALUE PER TON									
Lump [2] and Broken	$11.17	$11.44	$11.29	------	------	------	$11.17	$11.44	$11.29
Egg	10.88	10.61	10.84	------	------	------	10.88	10.61	10.84
Stove	11.17	10.99	11.10	------	------	------	11.17	10.99	11.10
Chestnut	11.36	11.37	11.36	------	$9.01	$9.01	11.36	11.37	11.36
Pea	8.91	9.91	9.65	------	6.60	6.60	8.91	9.91	9.65
Total Pea and larger	10.87	10.74	10.80	------	7.08	7.08	10.87	10.74	10.80
Buckwheat No. 1	8.07	8.82	8.55	------	5.33	5.33	8.07	8.81	8.55
Buckwheat No. 2 (Rice)	8.12	8.78	8.55	------	6.89	6.89	8.12	8.77	8.55
Buckwheat No. 3 (Barley)	6.88	6.79	6.83	$6.50	4.14	4.89	6.88	6.77	6.82
Buckwheat No. 4	4.88	4.80	4.85	5.00	3.97	4.05	4.88	4.72	4.82
Buckwheat No. 5	4.51	4.14	4.43	3.75	3.56	3.59	4.51	4.10	4.41
Other [3]	2.90	2.49	2.64	3.02	3.19	3.05	2.96	2.58	2.77
Total Buckwheat No. 1 and smaller	5.90	6.70	6.32	3.05	3.45	3.16	5.59	6.58	6.09
Grand total	8.01	8.49	8.26	3.05	3.46	3.16	7.68	8.38	8.05

[1] Includes Sullivan County.
[2] Quantity of Lump included is insignificant.
[3] Includes various mixtures of Buckwheat Nos. 2 to 5 and coal of relatively low dollar value.

TABLE 5.—Sizes of Pennsylvania anthracite prepared at plants in 1961, by regions, in percent of total

(Excludes dredge coal)

Size	Lehigh region			Schuylkill region		
	Shipped by rail	Shipped by truck	Total	Shipped by rail	Shipped by truck	Total
Lump[1] and Broken	(2)	(2)	(2)	0.1	(2)	(2)
Egg	3.0	0.6	1.8	1.0	0.2	0.6
Stove	17.3	6.3	11.6	12.5	11.5	12.0
Chestnut	14.4	17.3	15.9	11.7	19.2	15.8
Pea	5.7	16.4	11.2	7.0	13.1	10.3
Total Pea and larger	40.4	40.6	40.5	32.3	44.0	38.7
Buckwheat No. 1	8.3	16.2	12.3	10.1	13.1	11.7
Buckwheat No. 2 (Rice)	5.0	12.7	8.9	7.1	11.0	9.2
Buckwheat No. 3 (Barley)	8.7	11.7	10.2	11.2	12.7	12.0
Buckwheat No. 4	15.1	3.0	9.0	9.5	5.4	7.2
Buckwheat No. 5	20.7	2.0	11.1	18.0	4.6	10.8
Other[3]	1.8	13.8	8.0	11.8	9.2	10.4
Total Buckwheat No. 1 and smaller	59.6	59.4	59.5	67.7	56.0	61.3

Size	Wyoming region[4]			Total		
Lump[1] and Broken	0.1	0.1	0.1	0.1	0.1	0.1
Egg	3.6	.3	1.9	2.3	.3	1.2
Stove	23.7	7.6	15.3	17.1	9.4	13.0
Chestnut	23.5	17.2	20.2	16.2	18.2	17.3
Pea	6.8	21.6	14.5	6.7	16.4	11.8
Total Pea and larger	57.7	46.8	52.0	42.4	44.4	43.4
Buckwheat No. 1	10.2	19.5	15.1	9.8	15.7	12.9
Buckwheat No. 2 (Rice)	6.7	11.9	9.4	6.6	11.5	9.2
Buckwheat No. 3 (Barley)	14.7	8.1	11.3	11.9	11.0	11.5
Buckwheat No. 4	4.1	2.0	3.0	8.7	3.9	6.1
Buckwheat No. 5	6.1	2.7	4.3	14.5	3.6	8.7
Other[3]	.5	9.0	4.9	6.1	9.9	8.2
Total Buckwheat No. 1 and smaller	42.3	53.2	48.0	57.6	55.6	56.6

[1] Quantity of Lump included is insignificant.
[2] Less than 0.05 percent.
[3] Includes various mixtures of Buckwheat Nos. 2 to 5 and coal of relatively low value.
[4] Includes Sullivan County.

TABLE 6.—Sizes of Pennsylvania anthracite prepared at plants, by regions, in percent of total

(Excludes dredge coal)

Size	Lehigh region					Schuylkill region				
	1957	1958	1959	1960	1961	1957	1958	1959	1960	1961
Lump [1] and Broken	(2)	(2)	0.1	------	(2)	0.4	0.2	0.1	0.1	(2)
Egg	0.9	1.1	.9	0.9	1.8	.6	.6	.6	.5	0.6
Stove	10.1	11.9	11.4	11.5	11.6	12.2	13.5	12.3	11.8	12.0
Chestnut	13.8	16.2	15.1	15.4	15.9	15.8	17.0	15.5	15.3	15.8
Pea	9.8	11.6	11.4	11.1	11.2	9.9	10.0	10.0	10.1	10.3
Total Pea and larger	34.6	40.8	38.9	38.9	40.5	38.9	41.3	38.5	37.8	38.7
Buckwheat No. 1	9.9	12.1	11.6	10.8	12.3	12.4	12.9	12.8	12.1	11.7
Buckwheat No. 2 (Rice)	7.7	10.0	9.1	8.6	8.9	9.2	9.5	9.1	9.5	9.2
Buckwheat No. 3 (Barley)	8.6	10.1	9.0	9.0	10.2	14.3	13.8	12.7	13.2	12.0
Buckwheat No. 4	8.3	7.8	7.4	7.3	9.0	7.1	6.3	6.4	7.3	7.2
Buckwheat No. 5	10.5	10.5	10.4	10.9	11.1	8.6	7.2	10.6	11.6	10.8
Other [3]	20.4	8.7	13.6	14.5	8.0	9.5	9.0	9.9	8.5	10.4
Total Buckwheat No. 1 and smaller	65.4	59.2	61.1	61.1	59.5	61.1	58.7	61.5	62.2	61.3

Size	Wyoming region [4]					Total				
	1957	1958	1959	1960	1961	1957	1958	1959	1960	1961
Lump [1] and Broken	0.3	0.1	0.1	0.1	0.1	0.3	0.1	0.1	0.1	0.1
Egg	1.2	.9	.8	.7	1.9	.9	.8	.7	.6	1.2
Stove	17.8	17.9	17.0	14.7	15.3	13.9	14.9	13.8	12.8	13.0
Chestnut	23.7	22.3	20.8	19.8	20.2	18.4	18.8	17.3	16.9	17.3
Pea	14.3	15.0	14.8	14.0	14.5	11.5	12.1	11.9	11.6	11.8
Total Pea and larger	57.3	56.2	53.5	49.3	52.0	45.0	46.7	43.8	42.0	43.4
Buckwheat No. 1	14.0	14.9	15.4	16.0	15.1	12.6	13.5	13.5	13.3	12.9
Buckwheat No. 2 (Rice)	8.7	8.9	9.4	9.2	9.4	8.8	9.4	9.2	9.2	9.2
Buckwheat No. 3 (Barley)	10.0	10.3	11.3	10.9	11.3	11.6	11.9	11.6	11.8	11.5
Buckwheat No. 4	2.1	1.9	2.6	2.2	3.0	5.4	4.9	5.2	5.5	6.1
Buckwheat No. 5	2.0	1.3	2.3	3.3	4.3	6.5	5.6	7.7	8.6	8.7
Other [3]	5.9	6.5	5.5	9.1	4.9	10.1	8.0	9.0	9.6	8.2
Total Buckwheat No. 1 and smaller	42.7	43.8	46.5	50.7	48.0	55.0	53.3	56.2	58.0	56.6

---

[1] Quantity of Lump included is insignificant.
[2] Less than 0.05 percent.
[3] Includes various mixtures of Buckwheat Nos. 2 to 5 and coal of relatively low value.
[4] Includes Sullivan County.

TABLE 7.—Production of Pennsylvania anthracite in 1961, by regions

Region	Production							
	Rail shipments		Truck shipments		Colliery fuel		Total	
	Net tons	Value [1]	Net tons	Value [1]	Net tons	Value	Net tons	Value [1]
Lehigh:								
Preparation plants	1,419,475	$11,172,484	1,481,960	$11,986,949	8,036	$60,880	2,909,471	$23,220,313
Dredges	----------	----------	2,975	11,900	----------	----------	2,975	11,900
Total Lehigh	1,419,475	11,172,484	1,484,935	11,998,849	8,036	60,880	2,912,446	23,232,213
Schuylkill:								
Preparation plants	3,767,656	26,320,094	4,478,416	35,617,813	6,640	51,240	8,252,712	61,989,147
Dredges	551,585	1,683,272	190,938	659,442	350	700	742,873	2,343,414
Total Schuylkill	4,319,241	28,003,366	4,669,354	36,277,255	6,990	51,940	8,995,585	64,332,561
Wyoming:								
Preparation plants [2]	2,633,081	25,123,116	2,875,259	27,436,537	30,068	213,114	5,538,408	52,772,767
Total:								
Preparation plants	7,820,212	62,615,694	8,835,635	75,041,299	44,744	325,234	16,700,591	137,982,227
Dredges	551,585	1,683,272	193,913	671,342	350	700	745,848	2,355,314
Grand total	8,371,797	64,298,966	9,029,548	75,712,641	45,094	325,934	17,446,439	140,337,541

[1] Value given for shipments is that at which coal left possession of producing company; does not include selling expenses.

[2] Includes Sullivan County.

TABLE 8.—Pennsylvania anthracite produced by fields, in net tons

	1957	1958	1959	1960	1961
Eastern Middle: Breakers and washeries	2,404,609	1,738,555	1,915,788	2,121,500	2,002,163
Western Middle:					
Breakers and washeries	6,930,428	5,982,747	5,813,868	5,104,897	4,673,983
Dredges	38,497	68,986	65,683	71,828	58,287
Total Western Middle	6,968,925	6,051,733	5,879,551	5,176,725	4,732,270
Southern:					
Breakers and washeries	6,061,879	5,086,583	5,269,930	4,530,628	4,486,037
Dredges	594,941	610,668	650,936	640,335	687,561
Total Southern	6,656,820	5,697,251	5,920,866	5,170,963	5,173,598
Northern:					
Breakers and washeries [1]	9,283,704	7,671,464	6,933,081	6,348,253	5,538,408
Dredges	24,263	12,139	----------	----------	----------
Total Northern	9,307,967	7,683,603	6,933,081	6,348,253	5,538,408
Total:					
Breakers and washeries	24,680,620	20,479,349	19,932,667	18,105,278	16,700,591
Dredges	657,701	691,793	716,619	712,163	745,848
Grand total	25,338,321	21,171,142	20,649,286	18,817,441	17,446,439

[1] Includes Sullivan County.

TABLE 9.—Production of Pennsylvania anthracite in 1961, by counties

County	Production							
	Rail shipments		Truck shipments		Colliery fuel		Total	
	Net tons	Value [1]	Net tons	Value [1]	Net tons	Value	Net tons	Value [1]
Berks, Lancaster, Lebanon, Northampton, and Snyder	544,236	$1,644,985	139,460	$453,863	--------	--------	683,696	$2,098,848
Carbon	458,836	3,643,112	92,171	187,794	106	$699	551,113	3,831,605
Columbia	282,597	1,854,111	197,130	1,986,493	463	3,145	480,190	3,843,749
Dauphin	79,924	426,154	55,470	205,285	--------	--------	135,394	631,439
Lackawanna	472,209	4,314,849	701,090	7,335,105	14,140	96,134	1,187,439	11,746,088
Luzerne	2,738,457	25,480,777	2,830,715	25,689,979	23,592	175,070	5,592,764	51,345,826
Northumberland	787,011	4,253,681	1,119,424	8,272,371	852	4,362	1,907,287	12,530,414
Schuylkill	3,008,527	22,681,297	3,871,848	31,437,631	5,931	46,424	6,886,306	54,165,352
Sullivan	--------	--------	17,188	90,234	10	100	17,198	90,334
Susquehanna and Wayne	--------	--------	5,052	53,886	--------	--------	5,052	53,886
Total	8,371,797	64,298,966	9,029,548	75,712,641	45,094	325,934	17,446,439	140,337,541

[1] Value given for shipments is that at which coal left possession of producing company; does not include selling expenses.

Underground Mines.—Of the 1.4 million-ton decline in total production between 1960 and 1961, approximately 900,000 tons occurred in underground mining. Underground output in the Wyoming region, which has traditionally led the industry in this type of mining, dropped more than 600,000 tons. In the Schuylkill region, deep-mined output decreased more than 100,000 tons. A loss also in excess of 100,000 tons occurred in the Lehigh region, where the industry's efforts to produce a greater proportion of total output from lower cost sources have had the most marked effect. Because of these disproportionate decreases, the Schuylkill region assumed leadership in underground production with 52 percent of the 1961 total (48 percent in 1960 and 43 percent in 1959) and the Wyoming's share dropped to 45 percent. The Lehigh region contributed 3 percent, compared with 4 percent in 1960 and 10 percent in 1959. Trends in production, by sources, are shown in figure 2. Tables 10 and 11 present data on output by source, fields, and regions.

TABLE 10.—Pennsylvania anthracite produced in 1961, classified as fresh mined, culm-bank, and river coal, by fields, in net tons

Field	Fresh mined coal				From culm banks	From river dredging	Total
	Underground mines			Strip pits			
	Mechanically loaded	Hand loaded	Total				
Eastern Middle	105,201	9,210	114,411	1,267,562	620,190	--------	2,002,163
Western Middle	265,179	1,280,647	1,545,826	2,272,760	855,397	58,287	4,732,270
Southern	375,594	1,683,293	2,058,887	1,869,005	558,145	687,561	5,173,598
Northern [1]	2,631,804	433,658	3,065,462	1,837,319	635,627	--------	5,538,408
Total	3,377,778	3,406,808	6,784,586	7,246,646	2,669,359	745,848	17,446,439

[1] Includes Sullivan County.

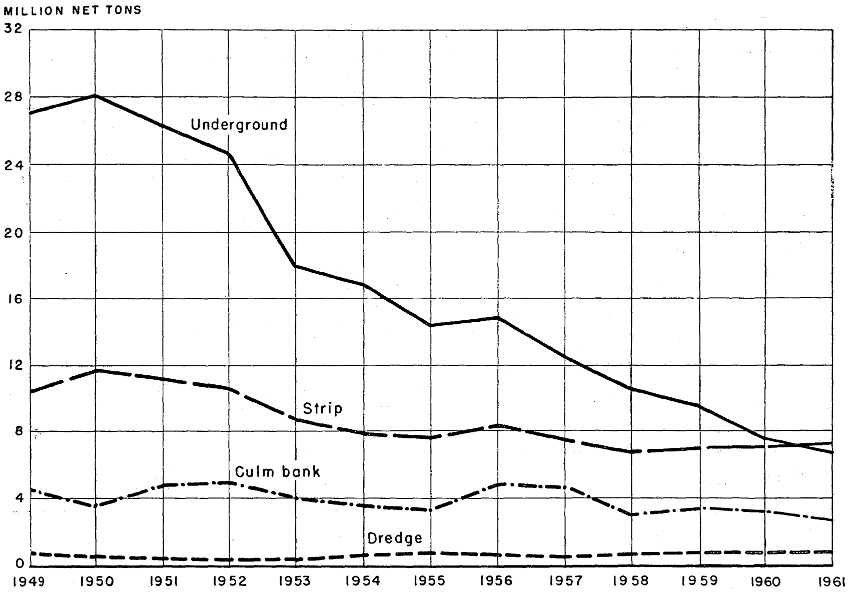

FIGURE 2.—Production of Pennsylvania anthracite, by sources, 1949–61.

TABLE 11.—Pennsylvania anthracite produced in 1961, classified as fresh mined, culm-bank, and river coal, by regions, in net tons

Region	Fresh mined coal: Underground mines: Mechanically loaded	Fresh mined coal: Underground mines: Hand loaded	Fresh mined coal: Underground mines: Total	Fresh mined coal: Strip pits	From culm banks	From river dredging	Total
Lehigh	105, 201	60, 135	165, 336	2, 087, 607	656, 528	2, 975	2, 912, 446
Schuylkill	640, 773	2, 913, 015	3, 553, 788	3, 321, 720	1, 377, 204	742, 873	8, 995, 585
Wyoming [1]	2, 631, 804	433, 658	3, 065, 462	1, 837, 319	635, 627		5, 538, 408
Total	3, 377, 778	3, 406, 808	6, 784, 586	7, 246, 646	2, 669, 359	745, 848	17, 446, 439

[1] Includes Sullivan County.

Strip Pits.—Although strip-pit production fell 11 percent below the 1960 rate in the Schuylkill region, output of strip coal increased 27 percent in the Lehigh region and 6 percent in the Wyoming region, resulting in a net gain of 2 percent. This increase, coupled with decreases in production from deep mines and culm banks, boosted stripped coal to 42 percent of total output in 1961—a new record. The Schuylkill region continued to lead in strip-pit production with 46 percent of the year's total (53 percent in 1960). The Lehigh region ranked second with 29 percent (23 percent in 1960), and the Wyoming ranked third with 25 percent (24 percent). Of the total fresh mined coal (strip plus underground) produced in 1961, 93 percent of the Lehigh production originated at strip pits, 48 percent of the Schuylkill's, and 37 percent of the Wyoming's. Comparable figures in 1960 were, respectively, 85, 50, and 32 percent. Detailed data on strip-pit production are shown for selected years in the period 1915–61 in table 12. The regional production of strip coal is charted in figure 3 for the 1935–61 period.

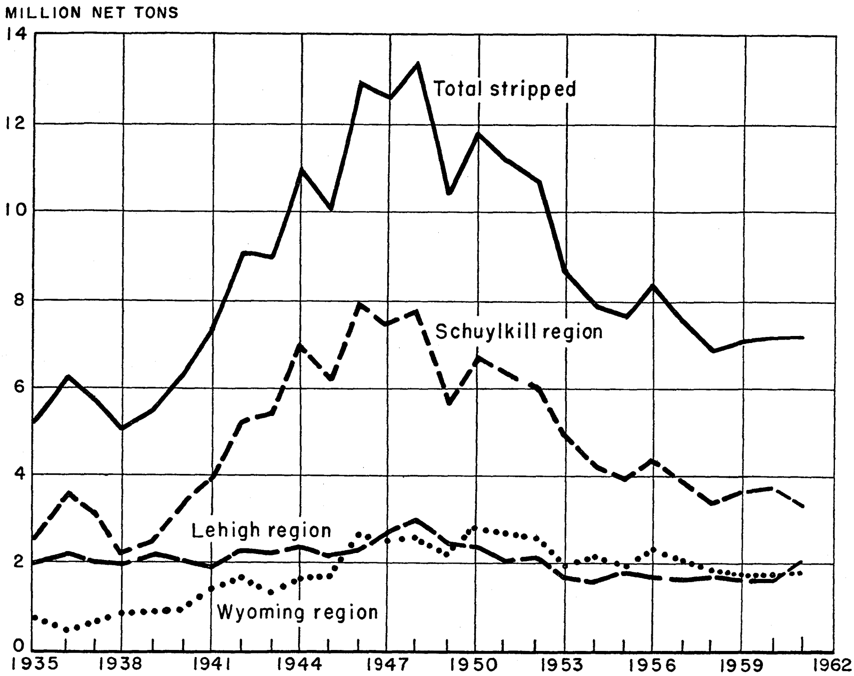

FIGURE 3.—Pennsylvania anthracite mined from strip pits by regions, 1935–61.

TABLE 12.—Production of Pennsylvania anthracite from strip pits

	Mined by stripping (net tons)	Percent of fresh-mined total	Number of men employed	Average number of days worked
1915	1,121,603	(1)	(1)	(1)
1920	2,054,441	2.5	(1)	(1)
1925	1,578,478	2.7	(1)	(1)
1930	2,536,288	3.8	(1)	(1)
1954	7,939,680	32.0	4,837	202
1955	7,703,907	34.7	[2] 4.642	[2] 205
1956	8,354,230	35.7	4,840	216
1957	7,543,157	37.4	4,546	207
1958	6,877,761	39.1	4,418	196
1959	7,096,343	43.0	3,775	200
1960	7,112,288	48.0	3,470	195
1961:				
Lehigh region	2,087,607	92.7	978	220
Schuylkill region	3,321,720	48.3	1,435	182
Wyoming region [3]	1,837,319	37.5	781	237
Total	7,246,646	51.6	3,194	207

[1] Data not available.
[2] Estimated.
[3] Includes Sullivan County.

Culm-Bank Coal.—Because of a lessened demand for the smaller sizes of anthracite and a comparatively stronger requirement for the large coals (virtually all of which are obtained from underground and stripping operations), output from culm banks dropped sharply in 1961 (19 percent). This decline was reflected in each region; the Wyoming region losing 30 percent; the Lehigh, 21 percent; and the Schuylkill, 12 percent. Output from banks in 1961 was divided as follows: Schuylkill region, 51 percent; Lehigh region, 25; and, the Wyoming region, 24 percent. Production of bank coal is shown in tables 10, 11, and 13.

TABLE 13.—Production of Pennsylvania anthracite from culm banks, by regions, in net tons

	Lehigh	Schuylkill	Wyoming	Sullivan County	Total
1935	192, 790	1, 748, 960	760, 718	------	2, 702, 468
1936	136, 058	2, 532, 116	525, 798	------	3, 193, 972
1937	101, 239	2, 178, 482	442, 878	------	2, 722, 599
1938	53, 037	1, 941, 896	345, 511	------	2, 340, 444
1939	64, 180	2, 159, 548	360, 086	------	2, 583, 814
1940	192, 878	2, 109, 557	480, 603	------	2, 783, 038
1941	326, 755	2, 881, 049	449, 062	------	3, 656, 866
1942	745, 934	3, 529, 757	459, 373	------	4, 735, 064
1943	1, 944, 047	4, 577, 917	1, 041, 841	19, 893	7, 583, 698
1944	2, 125, 317	5, 787, 036	1, 673, 994	13, 833	9, 600, 180
1945	2, 086, 864	4, 936, 907	1, 728, 440	34, 448	8, 786, 659
1946	1, 875, 590	4, 752, 141	1, 780, 874	22, 487	8, 431, 092
1947	1, 044, 501	3, 947, 016	1, 409, 217	2, 912	6, 403, 646
1948	796, 114	3, 729, 542	1, 098, 123	------	5, 623, 779
1949	694, 763	2, 778, 131	956, 250	------	4, 429, 144
1950	366, 069	2, 533, 535	565, 829	1, 877	3, 467, 310
1951	566, 613	3, 578, 795	484, 792	------	4, 630, 200
1952	791, 445	3, 407, 974	566, 097	------	4, 765, 516
1953	714, 646	2, 792, 323	504, 031	------	4, 011, 000
1954	797, 761	2, 320, 006	447, 715	------	3, 565, 482
1955	862, 539	1, 934, 492	416, 015	------	3, 213, 046
1956	1, 493, 381	2, 750, 838	530, 580	------	4, 774, 799
1957	1, 457, 869	2, 479, 241	584, 300	------	4, 521, 410
1958	605, 741	1, 742, 356	550, 756	3, 900	2, 902, 753
1959	831, 254	1, 905, 465	[1] 684, 135	(1)	3, 420, 854
1960	825, 825	1, 563, 746	907, 441	------	3, 297, 012
1961	656, 528	1, 377, 204	635, 627	------	2, 669, 359

[1] Sullivan County included in Wyoming region.

Dredge Coal.—The 1961 production of small sized anthracite by dredging was in marked contrast to the decline in overall output of Buckwheat No. 1 and smaller. Whereas total output of these sizes decreased 9 percent, dredge production increased 5 percent, undoubtedly because a large part of the output is "captive" tonnage. For this reason, the value data shown for 1956–58 in table 15 are not comparable, as an operator who ordinarily produces the bulk of the annual output of dredge coal reported "cost of production" rather than a fair market price. Detailed data on dredge coal are shown in tables 14 and 15.

TABLE 14.—Pennsylvania anthracite produced by dredges in 1961, by rivers (including tributaries)

River	Production (net tons)	Value	
		Total	Average
Lehigh	2,975	$11,900	$4.00
Schuylkill	122,880	396,236	3.22
Susquehanna	619,993	1,947,178	3.14
Total	745,848	2,355,314	3.16

TABLE 15.—Pennsylvania anthracite produced by dredges, by rivers (including tributaries)

	Lehigh River (net tons)	Schuylkill River (net tons)	Susquehanna River, (net tons)	Total (net tons)	Total value	Average value (per ton)
1940	[1] 78,947	([1])	863,997	942,944	$1,097,000	$1.16
1941	47,838	396,522	1,073,203	1,517,563	1,839,784	1.21
1942	9,385	268,919	1,006,729	1,285,033	1,478,719	1.15
1943	37,452	342,815	954,470	1,334,737	1,972,777	1.48
1944	40,894	494,371	837,472	1,372,737	2,084,431	1.52
1945	41,409	366,161	797,656	1,205,226	1,924,148	1.60
1946	37,441	247,757	847,196	1,132,394	2,091,324	1.85
1947	46,478	158,102	1,015,126	1,219,706	2,480,068	2.03
1948	54,284	67,871	865,849	988,004	2,291,752	2.32
1949	22,131	52,012	790,979	865,122	2,131,096	2.46
1950	21,877	34,222	563,465	619,564	1,677,508	2.71
1951	25,344	27,454	508,770	561,568	1,576,576	2.81
1952	17,402	30,407	324,245	372,054	1,109,778	2.98
1953	31,391	20,643	386,147	438,181	1,449,149	3.31
1954	16,015		709,892	725,907	1,810,026	2.49
1955	29,935	60,256	698,652	788,843	1,844,835	2.34
1956	44,262	5,540	666,485	716,287	1,273,415	1.78
1957	30,650	10,167	616,884	657,701	1,143,152	1.74
1958	30,763	10,230	650,800	691,793	1,324,943	1.92
1959	13,312	13,213	690,094	716,619	2,310,895	3.22
1960	22,700	23,624	665,839	712,163	2,257,367	3.17
1961	2,975	122,880	619,993	745,848	2,355,314	3.16

[1] Schuylkill included with Lehigh in 1940.

Weekly and Monthly Data.—Weekly and monthly estimates of the production of Pennsylvania anthracite are published by the Bureau in a series of Weekly Anthracite Reports. These estimates are based upon carloading data furnished by the Association of American Railroads, supplemented with truck-shipment data released by the Pennsylvania Department of Mines and Mineral Industries. Estimates for colliery fuel and dredge coal are based upon the annual production canvass. The weekly and monthly estimates for 1961 have been adjusted to the total production figure and are shown in tables 16 and 17. The Weekly Anthracite Reports also present monthly statistics on rail and truck shipments, producer and retail-dealer stocks, the Lake-dock trade, imports and exports, consumption, earnings, working time, and other related subjects. Individual copies or regular mailings of these reports may be obtained by writing to the Bureau of Mines, U.S. Department of the Interior, Washington 25, D.C.

TABLE 16.—Estimated weekly production of Pennsylvania anthracite in 1961 [1]

Week ended—	Thousand net tons	Week ended—	Thousand net tons	Week ended—	Thousand net tons	Week ended—	Thousand net tons
Jan. 7	362	Apr. 15	287	July 22	364	Oct. 28	413
14	420	22	326	29	326	Nov. 4	314
21	404	29	294	Aug. 5	340	11	351
28	411	May 6	315	12	312	18	345
Feb. 4	428	13	321	19	336	25	307
11	431	20	335	26	338	Dec. 2	361
18	421	27	302	Sept. 2	382	9	356
25	436	June 3	296	9	294	16	332
Mar. 4	350	10	346	16	365	23	349
11	301	17	374	23	317	30	253
18	317	24	400	30	327	31	--------
25	327	July 1	74	Oct. 7	357		
Apr. 1	324	8	63	14	364	Total	17,446
8	260	15	340	21	378		

[1] Estimated from weekly carloadings as reported by the Association of American Railroads and other factors; adjusted to annual production total from Bureau of Mines canvass.

TABLE 17.—Estimated monthly production of Pennsylvania anthracite, in thousand net tons [1]

Month	1954	1955	1956	1957	1958	1959	1960	1961
January	2,874	2,454	2,743	2,625	2,161	2,318	1,701	1,767
February	2,525	2,568	2,360	2,072	1,753	1,645	1,643	1,721
March	2,364	2,007	2,052	1,798	1,476	1,593	1,749	1,438
April	2,100	1,723	2,258	2,037	1,545	1,588	1,281	1,173
May	2,013	1,985	1,947	2,294	1,612	1,466	1,313	1,418
June	2,387	2,130	2,470	2,551	1,963	1,777	1,496	1,344
July	2,080	1,845	1,890	1,478	1,377	1,206	1,186	1,178
August	2,270	1,904	2,729	2,294	1,750	1,600	1,704	1,533
September	2,416	2,453	2,509	2,173	2,050	1,823	1,580	1,394
October	2,353	2,244	2,971	2,262	1,966	1,805	1,678	1,603
November	2,681	2,385	2,629	1,928	1,559	1,863	1,692	1,501
December	3,020	2,507	2,342	1,826	1,959	1,965	1,794	1,376
Total	29,083	26,205	28,900	25,338	21,171	20,649	18,817	17,446

[1] Production is estimated from weekly carloadings as reported by the Association of American Railroads and includes mine fuel, coal sold locally, and dredge coal.

Mechanical Loading.—The 900,000-ton decrease in underground mining was largely centered at mines equipped with some type of mechanical loading equipment. Of total underground production, about 3.4 million tons was mechanically loaded, a decline of 667,000 tons, or 16 percent, from 1960. Hand-loading fell about 250,000 tons, or approximately 7 percent. As a result, 50 percent of the year's output (47 percent in 1960), was hand-loaded and 50 percent (53 percent in 1960), was mechanically loaded. In the Northern field, where the coal seams are more amenable to mechanization, the quantity loaded mechanically underground declined 640,000 tons, or 20 percent. A decline of nearly 100,000 tons in the Southern field was largely offset by small gains in the Eastern and Western Middle fields. Of the total loaded mechanically underground in 1961, 78 percent was mined in the Northern field, 11 percent, in the Southern; 8 percent, in the Western Middle; and 3 percent, in the Eastern Middle field. Statistics on the tonnage loaded mechanically and on the quantity and types of machines used are presented in tables 18 to 20. Trends in mechanical loading, hand loading, and stripping are shown in figure 4 for 1935–61.

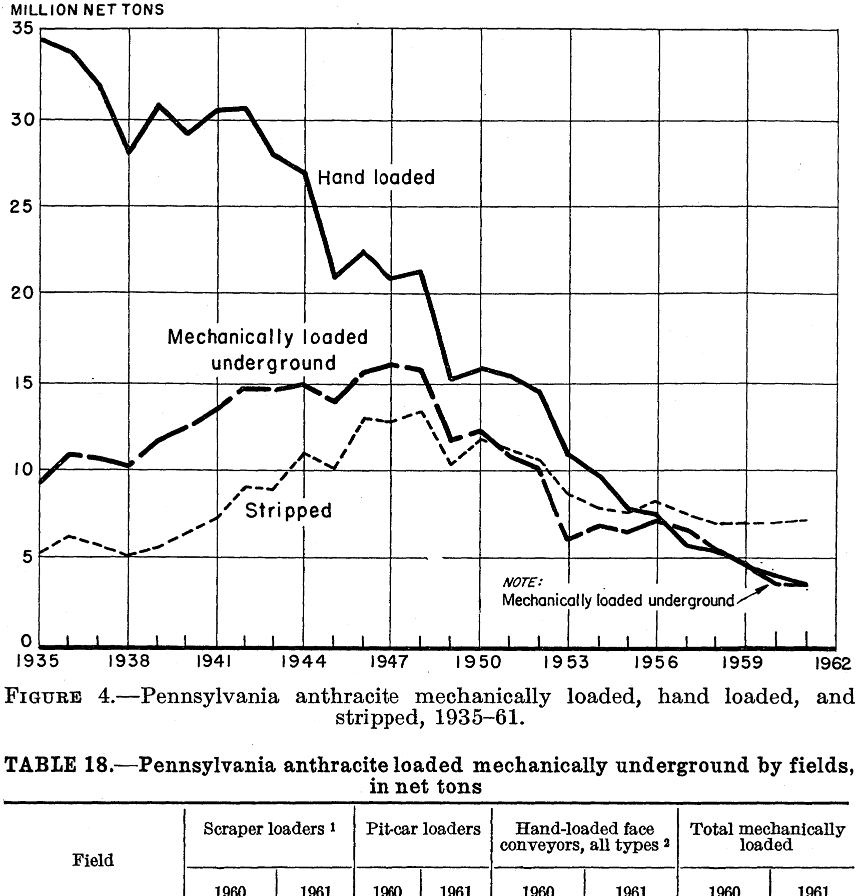

FIGURE 4.—Pennsylvania anthracite mechanically loaded, hand loaded, and stripped, 1935–61.

TABLE 18.—Pennsylvania anthracite loaded mechanically underground by fields, in net tons

Field	Scraper loaders [1]		Pit-car loaders		Hand-loaded face conveyors, all types [2]		Total mechanically loaded	
	1960	1961	1960	1961	1960	1961	1960	1961
Northern	1,052,054	810,284	--------	--------	2,219,795	1,821,520	3,271,849	2,631,804
Eastern Middle	42,825	2,515	--------	1,200	49,527	101,486	92,352	105,201
Western Middle	39,875	92,823	--------	--------	172,312	172,356	212,187	265,179
Southern	82,670	77,367	12,503	9,600	372,831	288,627	468,004	375,594
Total	1,217,424	982,989	12,503	10,800	2,814,465	2,383,989	4,044,392	3,377,778

[1] Includes mobile loaders.
[2] Shaker chutes, including those equipped with duckbills.

TABLE 19.—Pennsylvania anthracite loaded mechanically underground

Year	Scraper loaders		Mobile loaders		Conveyors [1] and pit-car loaders		Total loaded mechanically	
	Number of units	Net tons loaded	Number of units	Net tons loaded	Number of units	Net tons loaded	Number of units	Net tons loaded
1957	295	1,179,099	66	799,493	1,437	4,678,887	1,798	6,657,479
1958	290	931,313	51	658,549	1,234	3,742,181	1,575	5,332,043
1959	186	771,142	46	692,631	869	3,236,769	1,101	4,700,542
1960	114	525,482	45	691,942	754	2,826,968	913	4,044,392
1961	132	595,572	27	387,417	616	2,394,789	775	3,377,778

[1] Includes duckbills and other self-loading conveyors.

TABLE 20.—Trends in mechanical loading, hand loading, and stripping of Pennsylvania anthracite

(Mechanical loading includes coal handled on pit-car loaders and hand loaded face conveyors)

Year	Fresh mined coal							
	Underground					Strip pits		Total
	Mechanical loading (net tons)	Percent of total underground	Hand loading (net tons)	Percent of total underground	Total (net tons)	Net tons	Percent of total fresh mined	
1927	[1] 2,223,281	3.0	71,434,537	97.0	73,657,818	2,153,156	2.8	75,810,974
1928	[1] 2,351,074	3.4	67,373,788	96.6	69,724,862	2,422,924	3.4	72,147,786
1929	3,470,158	5.0	66,493,690	95.0	69,963,848	1,911,766	2.7	71,875,614
1930	4,467,750	6.9	60,458,344	93.1	64,926,094	2,536,288	3.8	67,462,382
1931	4,384,780	8.2	49,074,722	91.8	53,459,502	3,813,237	6.7	57,272,739
1932	5,433,340	12.4	38,400,820	87.6	43,834,160	3,980,973	8.3	47,815,133
1933	6,557,267	16.0	34,474,844	84.0	41,032,111	4,932,069	10.7	45,964,180
1934	9,284,486	19.1	39,290,255	80.9	48,574,741	5,798,138	10.7	54,372,879
1935	9,279,057	21.2	34,503,819	78.8	43,782,876	5,187,072	10.6	48,969,948
1936	10,827,946	24.2	33,898,560	75.8	44,726,506	6,203,267	12.2	50,929,773
1937	10,683,837	25.1	31,882,514	74.9	42,566,351	5,696,018	11.8	48,262,369
1938	10,151,669	26.6	27,990,628	73.4	38,142,297	5,095,341	11.8	43,237,638
1939	11,773,833	27.7	30,797,715	72.3	42,571,548	5,486,479	11.4	48,058,027
1940	12,326,000	29.7	29,190,837	70.3	41,516,837	6,352,700	13.3	47,869,537
1941	13,441,987	30.6	30,435,277	69.4	43,877,264	7,316,574	14.3	51,193,838
1942	14,741,459	32.6	30,495,240	67.4	45,236,699	9,070,933	16.7	54,307,632
1943	14,745,793	34.5	27,990,005	65.5	42,735,798	8,989,387	17.4	51,725,185
1944	14,975,146	35.8	26,800,270	64.2	41,775,416	10,953,030	20.8	52,728,446
1945	13,927,955	39.9	20,957,744	60.1	34,885,699	10,056,325	22.4	44,942,024
1946	15,619,162	41.0	22,465,295	59.0	38,084,457	12,858,930	25.2	50,943,387
1947	16,054,011	43.4	20,909,101	56.6	36,963,112	12,603,545	25.4	49,566,657
1948	15,742,368	42.3	21,432,923	57.7	37,175,291	13,352,874	26.4	50,528,165
1949	11,858,088	43.9	15,172,562	56.1	27,030,650	10,376,808	27.7	37,407,458
1950	12,335,650	43.8	15,820,245	56.2	28,155,895	11,833,934	29.6	39,989,829
1951	10,847,787	41.2	15,494,452	58.8	26,342,239	11,135,990	29.7	37,478,229
1952	10,034,464	40.5	14,713,819	59.5	24,748,283	10,696,705	30.2	35,444,988
1953	6,838,769	38.2	11,054,720	61.8	17,893,489	8,606,482	32.5	26,499,971
1954	6,978,035	41.4	9,874,373	58.6	16,852,408	7,939,680	32.0	24,792,088
1955	6,660,939	45.9	7,837,819	54.1	14,498,758	7,703,907	34.7	22,202,665
1956	7,308,110	48.5	7,746,794	51.5	15,054,904	8,354,230	35.7	23,409,134
1957	6,657,479	52.8	5,958,574	47.2	12,616,053	7,543,157	37.4	20,159,210
1958	5,332,043	49.8	5,366,792	50.2	10,698,835	6,877,761	39.1	17,576,596
1959	4,700,542	49.9	4,714,928	50.1	9,415,470	7,096,343	43.0	16,511,813
1960	4,044,392	52.6	3,651,586	47.4	7,695,978	7,112,288	48.0	14,808,266
1961	3,377,778	49.8	3,406,808	50.2	6,784,586	7,246,646	51.6	14,031,232

[1] As reported by Commonwealth of Pennsylvania, Department of Mines.

Cutting Machines.—Seven cutting machines were in use in 1961, the same as in 1960. However, the total undercut before shooting rose slightly—from 226,000 tons in 1960 to 236,000 in 1961, all of which was produced in the Wyoming region (Northern field).

Power Equipment.—Although production from old culm and silt banks declined sharply and output from strip pits rose 2 percent in 1961, the number of power units reported used for each of these types of mining decreased slightly. At strip pits, 142 shovels and 197 draglines were reported used, a decline of 1 and an increase of 8 units, respectively. In culm-bank work, 30 shovels and 46 draglines were used—3 more shovels and 9 more draglines than in 1960. However, of this equipment, 4 shovels and 12 draglines were reported used for both stripping and culm-bank recovery, increasing by 4 shovels and 8 draglines. The number of power units used by the anthracite industry in 1959–61 are shown, by type of power, in table 21.

TABLE 21.—Power shovels and draglines used in recovering coal from culm banks and in stripping Pennsylvania anthracite, by type or power

Type of power	1959			1960			1961		
	Number of power shovels	Number of draglines	Total	Number of power shovels	Number of draglines	Total	Number of power shovels	Number of draglines	Total
Gasoline	14	6	20	23	11	34	22	15	37
Electric	51	45	96	43	51	94	41	56	97
Diesel	103	182	285	104	160	264	103	158	261
Diesel-electric	----	----	----	----	----	----	2	2	4
Total	168	233	401	170	222	392	168	231	399

PRICES AND VALUE OF SALES

Because value data for 1961 were collected on the basis of carrier method (rail and truck) rather than as shipments to points inside and outside the producing region, as heretofore, the two sets of data cannot be correlated. However, on the basis of total production, the average value per ton rose from $7.82 in 1960 to $8.04 in 1961, and the total value received for the year's output declined only 5 percent ($147,116,000 in 1960 to $140,338,000) as compared with a decline of 7 percent in total production.

As indicated elsewhere in this chapter, the comparatively stronger demand for the larger, high-priced sizes materially affected the industry's revenue. As a group, shipments of Pea and larger sizes declined 4 percent, but the average value per ton (excluding dredge coal) rose from $10.42 to $10.80. Shipments of Buckwheat No. 1 and smaller declined 9 percent, yet the average value per ton (again excluding dredge) rose only from $6.27 to $6.32. Among the larger sizes, Pea coal gained only $0.08 per ton, but other increases ranged from $0.42 for Lump and Broken to $0.54 for Stove. In the Buckwheat range, Nos. 1 and 2 (Rice) varied only $0.01 per ton; No. 3 (Barley) declined $0.12 and No. 4, $0.10. The f.o.b. mine value for No. 5 remained steady at $4.43, but the "Other" category rose $0.12 per ton despite decreased shipments.

Quotations in the November 25 issue of Saward's Journal, which continued in effect throughout the remainder of the year, also reflected the generally firmer price. Although the top prices quoted were generally somewhat lower than in December 1960, the lower quotations in the larger sizes were markedly higher; gaps between highs and lows were narrower. The November 1961 price ranges for "standard" quality anthracite were as follows: Broken, $14.00 per net ton (all companies quoting); Egg, Stove, and Chestnut, $13.25 to $14.50; Pea, $10.45 to $11.75; Buckwheat No. 1, $9.25 to $10.75; No. 2 (Rice), $9.25 to $10.50; and No. 3 (Barley), $8.15 to $8.75. Prices on Buckwheat No. 4 and smaller sizes customarily are set by negotiation between buyer and seller.

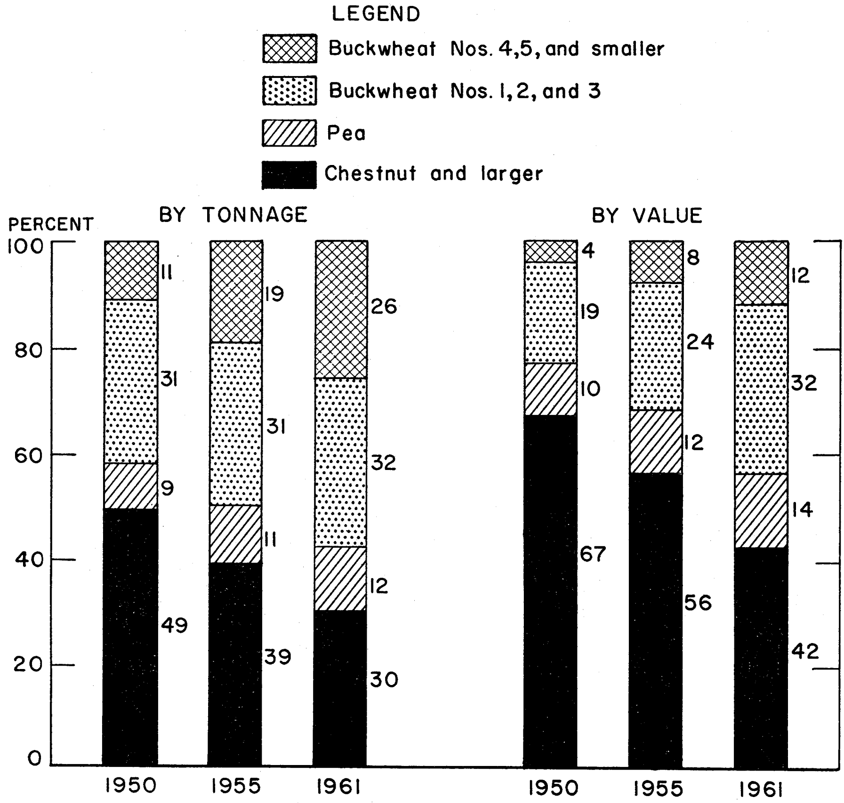

FIGURE 5.—Shipments of Pennsylvania anthracite, 1950, 1955, and 1961, by size groups, in percent of total tonnage and total value.

Retail prices of selected fuels are shown for certain cities in table 22. Average values received f.o.b. preparation plants are shown by regions in table 23 to 25. Trends in the shipment and value by size categories are charted in figure 5.

TABLE 22.—Retail prices of selected fuels in 1961, by months, for various cities [1]

(Coal and coke, per net ton; heating oil, per 100 gallons; gas, per 100 therms)

City and fuel	January	February	March	April	May	June	July	August	September	October	November	December
Baltimore, Md.:												
Anthracite:												
Stove	$22.66	$22.66	$22.66	$22.66	$22.40	$22.40	$22.40	$21.03	$21.03	$21.23	$21.57	$21.74
Buckwheat No. 1	19.40	19.40	19.40	19.40	19.40	19.40	19.40	19.40	19.40	19.40	19.91	20.00
Heating oil: Fuel oil No. 2	15.17	15.76	15.76	15.55	15.28	15.28	15.28	15.59	15.59	15.59	15.59	15.79
Boston, Mass.:												
Anthracite:												
Stove	31.25	31.25	31.25	31.25	30.48	30.48	30.48	30.98	30.98	31.50	31.50	31.50
Buckwheat No. 1	25.44	25.44	25.44	25.44	25.19	25.19	25.19	25.69	25.75	25.50	25.50	25.50
Heating oil: Fuel oil No. 2	15.92	16.32	16.40	15.93	15.77	15.68	15.68	15.83	15.83	15.83	15.83	16.20
New York, N.Y.:												
Anthracite:												
Stove	26.68	27.19	27.19	27.19	26.16	26.16	26.60	26.60	26.92	26.92	26.92	27.82
Pea	23.12	23.50	23.50	23.50	22.39	22.39	22.90	22.90	23.18	23.18	23.18	23.73
Buckwheat No. 1	21.73	22.20	22.20	22.20	20.72	20.97	21.37	21.37	21.58	21.58	21.58	22.00
Heating oil: Fuel oil No. 2	15.78	16.22	16.22	15.74	15.37	15.37	15.37	15.62	15.62	15.62	15.62	16.01
Philadelphia, Pa.:												
Anthracite:												
Chestnut	23.12	24.12	24.12	24.12	22.45	22.45	22.12	22.12	22.78	23.45	25.78	25.78
Buckwheat No. 1	20.45	20.45	20.45	20.45	19.78	19.78	19.45	19.45	19.45	19.95	20.95	20.78
Heating oil: Fuel oil No. 2	15.50	16.07	16.02	15.50	15.24	14.85	14.72	15.03	15.03	15.03	15.29	15.81
Washington, D.C.:												
Anthracite:												
Chestnut	26.84	26.84	26.84	26.84	23.44	24.03	25.02	26.09	26.86	26.86	27.66	27.66
Buckwheat No. 1	21.10	21.10	21.10	21.10	19.92	20.19	20.57	20.91	21.07	21.07	21.39	21.39
Heating oil: Fuel oil No. 2	15.34	15.85	15.85	15.65	15.32	15.32	15.32	15.63	15.63	15.63	15.63	15.95
Gas, Natural	13.89	13.89	13.89	13.89	13.89	13.89	13.89	13.23	13.17	13.07	13.09	13.12

---

[1] Compiled from reports of Bureau of Labor Statistics. Prices are as of the 15th of each month. Data are preliminary. Sales tax included where applicable.

TABLE 23.—Average sales realization per net ton of Pennsylvania anthracite at preparation plants, in 1961, by regions and sizes

(Excludes dredge coal)

Size	Lehigh region			Schuylkill region		
	Shipped by rail	Shipped by truck	Total	Shipped by rail	Shipped by truck	Total
Lump [1] and Broken	$11.29	$11.29	$11.29	$10.71	$11.30	$10.96
Egg	10.85	10.49	10.79	10.42	10.28	10.39
Stove	11.07	11.34	11.14	10.74	10.65	10.69
Chestnut	11.34	11.67	11.52	10.86	10.77	10.80
Pea	8.95	9.31	9.22	8.43	8.76	8.66
Total Pea and larger	10.85	10.65	10.75	10.27	10.14	10.19
Buckwheat No. 1	8.22	8.25	8.24	7.86	8.08	7.99
Buckwheat No. 2 (Rice)	8.27	9.26	8.99	7.74	8.05	7.94
Buckwheat No. 3 (Barley)	6.76	6.98	6.89	6.77	6.51	6.62
Buckwheat No. 4	4.84	5.05	4.88	4.83	4.65	4.76
Buckwheat No. 5	4.80	3.67	4.70	4.27	3.98	4.21
Other [2]	4.34	1.56	1.86	2.85	3.14	2.99
Total Buckwheat No. 1 and smaller	5.85	6.34	6.10	5.42	6.23	5.82
Total all sizes	7.87	8.09	7.98	6.99	7.95	7.51
	Wyoming region [3]			Total		
Lump [1] and Broken	$11.48	$11.53	$11.50	$11.17	$11.44	$11.29
Egg	11.08	11.05	11.08	10.88	10.61	10.84
Stove	11.54	11.64	11.57	11.17	10.99	11.10
Chestnut	11.72	12.24	11.96	11.36	11.37	11.36
Pea	9.61	11.23	10.87	8.91	9.91	9.65
Total Pea and larger	11.36	11.67	11.51	10.87	10.74	10.80
Buckwheat No. 1	8.32	9.84	9.34	8.07	8.82	8.55
Buckwheat No. 2 (Rice)	8.62	9.56	9.24	8.12	8.78	8.55
Buckwheat No. 3 (Barley)	7.04	7.34	7.15	6.88	6.79	6.83
Buckwheat No. 4	5.11	5.23	5.15	4.88	4.80	4.85
Buckwheat No. 5	4.98	4.74	4.90	4.51	4.14	4.43
Other [2]	1.65	2.20	2.18	2.90	2.49	2.64
Total Buckwheat No. 1 and smaller	7.06	7.67	7.41	5.90	6.70	6.32
Total all sizes	9.54	9.54	9.54	8.01	8.49	8.26

[1] Quantity of Lump is insignificant.
[2] Includes various mixtures of Buckwheat Nos. 2 to 5 and coal of relatively low dollar value.
[3] Includes Sullivan County.

TABLE 24.—Average sales realization per net tons of Pennsylvania anthracite at preparation plants, by regions and sizes

(Excludes dredge coal)

Size	Lehigh region					Schuylkill region				
	1957	1958	1959	1960	1961	1957	1958	1959	1960	1961
Lump [1] and Broken	$14.12	$11.99	$12.88	-------	$11.29	$14.65	$13.74	$12.24	$10.62	$10.96
Egg	13.10	12.02	12.06	$10.23	10.79	13.27	12.11	11.26	10.23	10.39
Stove	13.54	12.85	11.89	10.59	11.14	12.77	11.83	11.06	10.39	10.69
Chestnut	13.70	13.18	12.11	10.98	11.52	12.75	11.86	11.11	10.56	10.80
Pea	10.92	10.60	10.07	9.44	9.22	10.39	9.69	9.14	8.59	8.66
Total Pea and larger	12.85	12.32	11.44	10.41	10.75	12.18	11.34	10.59	9.97	10.19
Buckwheat No. 1	9.74	9.56	9.22	8.75	8.24	9.10	8.77	8.60	8.14	7.99
Buckwheat No. 2 (Rice)	8.92	9.35	9.56	9.29	8.99	8.23	8.41	8.39	7.99	7.94
Buckwheat No. 3 (Barley)	6.56	6.95	7.55	7.25	6.89	6.31	6.54	6.84	6.76	6.62
Buckwheat No. 4	5.08	5.01	5.11	5.05	4.88	4.75	4.76	4.80	4.88	4.76
Buckwheat No. 5	4.81	4.74	4.96	4.89	4.70	4.71	4.32	4.37	4.23	4.21
Other [2]	3.83	2.52	2.31	1.77	1.86	3.78	3.34	2.75	2.90	2.99
Total Buckwheat No. 1 and smaller	6.00	6.59	6.27	5.82	6.10	6.36	6.38	6.14	6.00	5.82
Total all sizes	8.37	8.93	8.28	7.60	7.98	8.63	8.43	7.85	7.50	7.51
	Wyoming region [3]					Total				
Lump [1] and Broken	$12.97	$12.40	$11.84	$11.20	$11.50	$13.98	$13.35	$12.25	$10.87	$11.29
Egg	12.34	11.91	11.22	10.42	11.08	12.76	12.00	11.44	10.31	10.84
Stove	13.00	12.22	11.32	10.74	11.57	12.98	12.14	11.29	10.56	11.10
Chestnut	13.23	12.55	11.75	11.23	11.96	13.11	12.36	11.53	10.89	11.36
Pea	11.04	11.08	10.85	10.64	10.87	10.77	10.48	10.03	9.57	9.65
Total Pea and larger	12.60	12.04	11.36	10.90	11.51	12.47	11.80	11.04	10.42	10.80
Buckwheat No. 1	9.49	9.78	9.48	8.92	9.34	9.35	9.30	9.04	8.54	8.55
Buckwheat No. 2 (Rice)	8.57	8.99	9.27	9.09	9.24	8.46	8.78	8.90	8.56	8.55
Buckwheat No. 3 (Barley)	6.31	6.79	7.15	7.16	7.15	6.34	6.68	7.04	6.95	6.83
Buckwheat No. 4	4.96	5.02	5.20	5.19	5.15	4.87	4.86	4.95	4.95	4.85
Buckwheat No. 5	3.90	4.04	4.70	4.78	4.90	4.64	4.43	4.54	4.43	4.43
Other [2]	3.70	3.66	3.53	2.54	2.18	3.78	3.29	2.80	2.52	2.64
Total Buckwheat No. 1 and smaller	7.28	7.63	7.69	7.00	7.41	6.55	6.80	6.60	6.27	6.32
Total all sizes	10.33	10.11	9.65	8.92	9.54	9.22	9.14	8.55	8.01	8.26

---

[1] Quantity of Lump included is insignificant.

[2] Includes various mixtures of Buckwheat Nos. 2 to 5 and coal of relatively low value.

[3] Includes Sullivan County.

TABLE 25.—Average value per net ton of Pennsylvania anthracite from all sources, in 1961, by regions [1]

	Shipped by rail	Shipped by truck	Colliery fuel	Total
Lehigh	$7.98	$8.08	$7.58	$7.98
Schuylkill	7.15	7.77	7.43	7.15
Wyoming [2]	9.54	9.54	7.09	9.53
Total	7.68	8.38	7.23	8.04

[1] Value given for shipments is that at which coal left possession of producing company and does not include selling expenses.

[2] Includes Sullivan County.

EMPLOYMENT

Employment at anthracite operations has continued to decline since 1947. The number of men working daily in 1961 averaged 15,792, 17 percent less than in 1960. Employment declined proportionally more than production chiefly because output at deep mines, which require more manpower, decreased sharply and partly because the producing operations were active a greater number of days.

Of the total labor force shown in table 26, 50 percent was in the Schuylkill region, 37 percent in the Wyoming, and 13 percent in the Lehigh. Employment declined in each of the regions, as follows: Schuylkill, 10 percent; Wyoming, 19 percent; and Lehigh, 33 percent.

Schuylkill, Luzerne, Northumberland, and Lackawanna, in order, were the leading counties in the number of men working daily at anthracite operations, as shown in table 27. The combined working force of these counties was 93 percent of the industry total. Employment declined in each of the major producing counties. The decreases were 13 percent in both Luzerne and Northumberland Counties, 21 percent in Schuylkill, and 24 percent in Lackawanna.

Of the number of men working in 1961, 42 percent were in underground mines, 20 percent at strip pits, 17 percent in preparation plants, 16 percent in surface work at underground mines (including general shops), 4 percent at culm banks, and 1 percent on dredge operations. The total number of men working at deep mines (underground plus associated surface workers) was 9,080, a 23-percent decrease from the corresponding total of 11,723 in 1960. At strip mines, the decline in employment was less, 8 percent.

Anthracite operations were active an average of 196 days in 1961—20 more than in 1960. In the Wyoming region, operations were active an average of 211 days; in the Lehigh region, 200; in the Schuylkill region, 184 days. Because the reduced labor force worked more days, the total number of man-days worked declined only 8 percent from 1960 to a total of 3,098,000 in 1961.

The productivity rate in the anthracite industry advanced to a record of 5.63 tons per man-day, a 0.5 percent gain over the former record of 5.60 tons. The gain in 1961 resulted principally from the decreased production from underground mines and increased output from strip mines, which have an appreciably higher productivity rate. Output increased in the Lehigh and Schuylkill regions to 7.26 and

TABLE 26.—Men employed, days worked, man days of labor and output per man per day at operations producing Pennsylvania anthracite in 1961

(Includes operations of strip contractors)

	Lehigh region	Schuylkill region	Wyoming region [1]	Total	
				1961	1960
Average number of men working daily:					
Underground	192	3,465	3,007	6,664	9,041
In strip pits	978	1,435	781	3,194	3,470
At culm banks	183	282	162	627	585
At preparation plants	505	1,473	752	2,730	3,145
Other surface	119	1,058	1,239	2,416	2,682
Total excluding dredge operations	1,977	7,713	5,941	15,631	18,923
Dredge operations	30	131		161	128
Total	2,007	7,844	5,941	15,792	19,051
Average number of days active:					
All operations except dredges	253	182	211	196	176
Dredge operations	28	226		189	211
Average, all operations	200	184	211	196	176
Man-days of labor:					
All operations except dredges	400,400	1,410,579	1,256,206	3,067,185	3,333,481
Dredge operations	825	29,627		30,452	26,974
Total, all operations	401,225	1,440,206	1,256,206	3,097,637	3,360,455
Average tons per man-day:					
All operations except dredges	7.27	5.85	4.41	5.44	5.43
Dredge operations	3.61	25.07		24.49	26.40
Average, all operations	7.26	6.25	4.41	5.63	5.60

[1] Includes Sullivan County.

TABLE 27.—Men employed at operations producing Pennsylvania anthracite, by counties

(Includes operations of strip contractors)

County	1960	1961	County	1960	1961
Berks, Lancaster, Lebanon, Northampton, and Snyder [1]	79	118	Luzerne	5,713	4,987
Carbon	312	324	Northumberland	2,600	2,261
Columbia	637	436	Schuylkill	6,992	5,553
Dauphin	194	189	Sullivan	21	13
Lackawanna	2,496	1,906	Susquehanna and Wayne	7	5
			Total	19,051	15,792

[1] None employed in Berks in 1960.

6.25 tons per man-day, respectively. In the Wyoming region, however, the productivity rare decreased to 4.41 tons per man-day.

DISTRIBUTION

Based on reports submitted to the Bureau of Mines by producers, wholesalers, and dock operators, 16,640,000 tons of Pennsylvania anthracite was shipped to final destinations during the 1960–61 coal year (April 1–March 31), a decline of about 12 percent from the preceding year. Of this total, approximately 91 percent was marketed in the United States, 7 percent in Canada, and 2 percent in overseas countries. When compared with 1959–60 coal-year shipments, these data indicate losses of 12 and 20 percent in American and Canadian markets, respectively, and a gain of approximately 47 percent in exports overseas.

As in recent years, continued strong competition from other fuels was most evident in the market for the larger space-heating sizes, both in Canada and the United States. In U.S. markets, shipments of the hand-fired sizes (Pea and larger) declined 13 percent, but decreases in shipments of Buckwheat Nos. 1, 2 (Rice), and 3 (Barley), large tonnages of which are burned in automatic equipment, were less severe—8, 9, and 12 percent, respectively. After making a moderate recovery during the 1959–60 coal-year, demand for the industrial sizes (Buckwheat Nos. 4 and smaller) again declined, as shipments of these sizes fell 12 percent below the 1959–60 coal-year volume.

Trends in the important Canadian market were somewhat similar to those in the United States, as exports to that country of Pea and larger dropped 26 percent and Buckwheat No. 1, 24 percent. In contrast, however, Canadian imports of Buckwheat Nos. 2 (Rice) and 3 (Barley) gained 10 and 31 percent, respectively, and imports of Buckwheat No. 4 and smaller sizes fell only 5 percent. In the overseas trade, about two-thirds of the total consisted of Buckwheat No. 4 and smaller sizes.

All major domestic markets received less anthracite than in the 1959–60 coal-year. Anthracite receipts in the Lake States declined 21 percent; in the New England States, 15 percent; in the Middle Atlantic States, 11 percent; and in the South Atlantic States, 7 percent. Because of the relatively stable demand in the "local sales" area (down less than 2 percent), Pennsylvania took 50 percent of the total shipments reported—a new record. Trucks carried a record quantity to market—47 percent of the year's total—owing to a small absolute gain and because rail shipments declined a reported 20 percent. Distribution data for the 1960–61 coal-year are summarized by sizes, and by States and Provinces of destination, in table 28.

These trends in transportation were reflected in the monthly data for calendar year 1961 released by the Pennsylvania Department of Mines and Mineral Industries, except that increased exports during the last half lessened the decline in rail traffic for the year; rail traffic was about 7 percent below 1960. Shipments by truck were less than one-half of 1 percent lower. According to this source, several States received more rail-shipped anthracite than in 1960. Maryland gained 53 percent; Michigan, 9 percent; Ohio, 5 percent; Indiana, 4 percent; Pennsylvania, 2 percent. All other States received less than in 1960; the largest absolute losses were in the New England States, New York, and New Jersey. Except for the "Other States" category, the most stable trucking markets were New Jersey, Pennsylvania, and New York. New Jersey received 17 percent more tonnage by truck than in 1960, and Pennsylvania and New York only about 1 and 2 percent less, respectively. Truck and rail shipments are shown for the 5-year period, 1957–61, in table 29 and 30; truck shipments in 1961, by months, in table 31.

The Lake-dock trade slumped sharply in 1961. Lake Erie loadings totaled 221,000 tons, a decline of 9 percent, and only 19,000 tons were loaded over docks on Lake Ontario, a decline of 29,000 tons or 60

TABLE 28.—Distribution of Pennsylvania anthracite, April 1, 1960, to March 31, 1961, by States, Provinces, and countries of destination, in net tons

Destination	Pea and larger						Buckwheat No. 1 and smaller					All sizes, total	Percent of total
	Broken	Egg	Stove	Chestnut	Pea	Total	Buckwheat No. 1	Buckwheat No. 2 (Rice)	Buckwheat No. 3 (Barley)	Other	Total		
United States:													
New England States:													
Connecticut	----------	761	39,582	43,032	2,272	85,647	5,607	7,248	8,876	6,529	28,260	113,907	0.68
Maine	----------	1,531	34,446	28,548	769	65,294	4,732	11,029	----------	41	15,802	81,096	.49
Massachusetts	632	18,775	215,443	100,950	10,223	346,023	51,558	44,491	8,409	54	104,512	450,535	2.71
New Hampshire	----------	923	22,556	15,170	1,172	39,821	5,382	8,682	----------	313	14,377	54,198	.33
Rhode Island	----------	275	11,908	7,093	435	19,711	4,179	1,981	----------	----------	6,160	25,871	.15
Vermont	----------	877	27,112	17,960	3,418	49,367	13,246	18,936	39	----------	32,221	81,588	.49
Total	632	23,142	351,047	212,753	18,289	605,863	84,704	92,367	17,324	6,937	201,332	807,195	4.85
Middle Atlantic States:													
New Jersey	377	11,665	180,784	413,279	123,810	729,915	189,454	168,905	276,156	268,583	903,098	1,633,013	9.82
New York	310	39,321	511,954	495,384	611,554	1,658,523	599,567	291,520	344,368	351,001	1,586,456	3,244,979	19.50
Pennsylvania [1]	4,330	19,583	615,980	1,307,736	1,134,546	3,082,175	1,151,005	935,254	1,406,667	1,742,086	5,235,012	8,317,187	49.98
Total	5,017	70,569	1,308,718	2,216,399	1,869,910	5,470,613	1,940,026	1,395,679	2,027,191	2,361,670	7,724,566	13,195,179	79.30
South Atlantic States: [2]													
Delaware	4,486	307	14,666	42,424	3,703	65,586	1,169	747	18,610	18	20,544	86,130	0.52
District of Columbia	----------	682	14,689	13,141	1,552	30,064	5,701	833	708	----------	7,242	37,306	.22
Maryland	244	1,761	59,565	54,813	3,788	120,171	25,970	5,178	190	200,362	231,700	351,871	2.11
Virginia	----------	374	7,607	6,789	1,093	15,863	2,942	388	----------	73	3,403	19,266	.12
Total	4,730	3,124	96,527	117,167	10,136	231,684	35,782	7,146	19,508	200,453	262,889	494,573	2.97
Lake States: [3]													
Illinois	28	61	3,748	5,643	345	9,825	63,283	13,242	3,652	20,908	101,085	110,910	0.67
Michigan	----------	219	7,962	4,746	287	13,214	4,703	17,243	5	99,735	121,686	134,900	.81
Minnesota	----------	----------	466	1,182	161	1,809	2	46	2	12,455	12,505	14,314	.09
Ohio	----------	1,439	2,938	3,010	3,721	11,108	26,696	14,763	10,340	94,255	146,054	157,162	.94
Wisconsin	----------	21	19,327	23,476	1,595	44,419	7,979	1,586	4	30,850	40,419	84,838	.51
Total	28	1,740	34,441	38,057	6,109	80,375	102,663	46,880	14,003	258,203	421,749	502,124	3.02
All other States	114	6,471	4,525	10,825	2,742	24,677	31,310	5,646	9,915	125,714	172,585	197,262	1.18
Total United States	10,521	105,046	1,795,258	2,595,201	1,907,186	6,413,212	2,194,485	1,547,718	2,087,941	2,952,977	8,783,121	15,196,333	91.32
Canada:													
Ontario	----------	4,822	330,655	243,038	55,999	634,514	29,364	26,057	7,321	14,631	77,373	711,887	4.28
Quebec	----------	1,801	69,084	37,191	4,940	113,016	64,241	59,090	62,948	82,537	268,816	381,832	2.29
Other Provinces	351	1,517	6,598	3,950	----------	12,416	53	534	1	2	590	13,006	.08
Total Canada	351	8,140	406,337	284,179	60,939	759,946	93,658	85,681	70,270	97,170	346,779	1,106,725	6.65
Other countries	----------	----------	23,583	19,522	39,124	82,229	42,360	----------	5	212,425	254,790	337,019	2.03
Grand total	10,872	113,186	2,225,178	2,898,902	2,007,249	7,255,387	2,330,503	1,633,399	2,158,216	3,262,572	9,384,690	16,640,077	100.00

[1] Includes "Local Sales."
[2] Shipments to other States in the South Atlantic area are included in "All other States."
[3] Shipments to Indiana are included in "All other States."

TABLE 29.—Rail shipments of Pennsylvania anthracite, by destinations, in net tons [1]

Destination	1957	1958	1959	1960	1961
New England States	1,287,632	1,032,680	932,593	712,780	602,262
New York	3,723,217	2,995,230	2,728,926	2,458,043	2,267,861
New Jersey	1,927,658	1,534,953	1,178,965	988,852	826,323
Pennsylvania	4,622,699	2,814,258	2,449,545	2,236,964	2,275,481
Delaware	86,231	69,816	57,597	48,586	42,194
Maryland	293,316	268,054	185,073	167,355	255,658
District of Columbia	39,244	39,901	43,664	22,024	19,561
Virginia	28,207	32,378	19,262	17,524	14,158
Ohio	251,585	148,711	260,278	165,903	174,620
Indiana	24,427	35,540	53,785	44,763	46,650
Illinois	133,817	81,090	99,826	91,640	76,348
Wisconsin	103,155	83,921	72,346	60,737	59,815
Minnesota	89,023	10,011	10,740	13,032	8,636
Michigan	52,718	30,723	28,815	50,835	55,218
Other States	165,434	100,560	160,260	154,586	121,119
Total United States	12,828,363	9,277,826	8,281,675	7,233,624	6,845,904
Canada	1,588,304	1,304,214	1,311,841	1,067,181	890,058
Other foreign countries	1,663,819	459,129	187,883	68,875	82,636
Grand total	16,080,486	11,041,169	9,781,399	8,369,680	7,818,598

[1] Compiled from reports of Pennsylvania Department of Mines and Mineral Industries; does not include dredge coal.

TABLE 30.—Truck shipments of Pennsylvania anthracite by destinations, in net tons [1]

Destination	1957	1958	1959	1960	1961
Pennsylvania:					
Within region	4,396,417	4,306,015	3,904,608	3,826,445	3,744,781
Outside region	2,006,029	2,624,608	2,704,972	2,900,414	2,891,607
New York	1,170,358	1,239,218	1,279,693	1,217,342	1,194,765
New Jersey	681,992	714,060	619,926	548,678	641,329
Delaware	33,452	42,169	44,748	48,221	45,310
Maryland	65,298	103,899	98,118	103,381	92,837
District of Columbia	2,800	4,174	6,639	6,232	5,753
Other States	9,574	15,116	13,669	17,703	26,169
Total	8,365,920	9,049,259	8,672,373	8,668,416	8,642,551

[1] Compiled from reports of Pennsylvania Department of Mines and Mineral Industries; does not include dredge coal.

percent. At Upper Lake docks, receipts declined even more abruptly, as the tonnage handled on Lake Superior and on Lake Michigan, declined 56 percent and 37 percent, respectively, from the 1960 season. The ex-dock movement was also down on both lakes, minus 15 percent at Lake Superior docks and 18 percent at Lake Michigan. Monthly data on the Lake-dock trade in anthracite are presented in table 2.

CONSUMPTION

The apparent consumption (production, plus imports, minus exports, and plus or minus changes in producers' stocks) of Pennsylvania anthracite totaled 15.9 million tons in 1961, a decline of 1.7 million, or 10 percent, from 1960.

No size data are available on exports for 1961; however, the decline in shipments to Canada (consisting mostly of large space-heating sizes) was offset largely by increased exports of the larger sizes to Europe, particularly West Germany. Accordingly, demand in U.S. space-

TABLE 31.—Truck shipments of Pennsylvania anthracite in 1961, by months and by States of destination, in net tons [1]

Destination	January	February	March	April	May	June	July
Pennsylvania:							
Within region	480,677	406,321	324,976	294,500	252,076	204,796	202,301
Outside region	340,480	316,565	224,520	207,224	209,411	211,327	160,519
New York	138,944	126,861	101,326	84,182	80,667	87,995	67,417
New Jersey	76,396	69,900	42,786	43,700	43,241	51,289	36,365
Delaware	6,645	6,847	3,135	2,932	1,737	2,842	1,961
Maryland	16,503	15,174	5,299	4,367	2,514	3,821	3,963
District of Columbia	1,500	1,100	625	446	40	116	98
Other States	2,678	2,288	1,412	614	1,850	1,423	1,209
Total: 1961	1,063,823	945,056	704,079	637,965	591,536	563,609	473,833
1960	941,954	875,899	976,005	565,706	534,067	599,800	455,249

Destination	August	September	October	November	December	Total	Percent of total
Pennsylvania:							
Within region	225,357	213,215	295,718	331,528	513,316	3,744,781	43.3
Outside region	220,966	214,452	258,845	273,567	253,731	2,891,607	33.5
New York	90,674	83,004	107,130	95,274	131,291	1,194,765	13.8
New Jersey	45,574	38,961	58,869	62,807	71,441	641,329	7.4
Delaware	3,245	2,127	3,719	4,467	5,653	45,310	.5
Maryland	6,357	6,287	7,924	9,497	11,131	92,837	1.1
District of Columbia	140	166	354	361	807	5,753	.1
Other States	2,310	1,816	2,653	3,964	3,952	26,169	.3
Total: 1961	594,623	560,028	735,212	781,465	991,322	8,642,551	100.0
1960	656,989	618,780	735,882	736,421	971,664	8,668,416	100.0

[1] Compiled from reports of Pennsylvania Department of Mines and Mineral Industries; does not include dredge coal.

heating markets apparently was more nearly approximate to the 4-percent decline in shipments of Pea and larger sizes than with apparent consumption. Also supporting this conjecture was the weather, which according to the Anthracite Institute was virtually the same as in 1960 (based on degree-days) in the primary anthracite market area, and the fact that monthly data issued by the Commonwealth of Pennsylvania indicated that deliveries in the producing region in 1961 declined less than one-half of 1 percent from the 1960 volume. The 10-percent decline in apparent consumption between 1960 and 1961 was attributable largely, therefore, to decreased industrial demand and to a decline in the volume handled by dealers outside the anthracite-producing region.

The 9-percent decline in shipments of Buckwheat No. 1 and smaller and the data that are available attest to the diminished requirements for industrial purposes in 1961. At public utility plants, consumption of anthracite declined about 9 percent below 1960 because water conditions for the generation of hydropower improved and the use of other fuels increased. The continued decrease in requirements for metallurgical coke was reflected at coke plants, where the 320,000 tons of anthracite reported used in 1961 as an admix with bituminous coal in manufacturing coke represented a decline of approximately 14 percent. The quantity of anthracite used by the iron and steel industries for sintering and pelletizing iron ores and for miscellaneous purposes also declined sharply; use for sintering and pellitizing iron ores decreased 22 percent and for miscellaneous purposes 5 percent. Consumption at cement plants (153,000 tons) remained virtually the same as in 1960. Anthracite producers again slashed consumption; the 45,000 tons reported used as colliery fuel was less than one-half the 1960 figure.

Consumption of anthracite by public utilities and coke plants is shown, by months, in table 2. The consumption of anthracite, briquets, domestic coke, heating and range oils, and natural gas in those States comprising the primary anthracite marketing area is presented in table 32. Retail-dealer deliveries and consumption by certain industrial groups are shown in table 33.

TABLE 32.—Apparent consumption of anthracite and selected competitive fuels in the principal anthracite markets

(Thousand net tons)

Fuel	New England	New York	New Jersey	Pennsylvania	Delaware	Maryland	District of Columbia	Total	Percent of total fuels
Anthracite (all users):[1]									
1958	1,033	[2] 4,234	[2] 2,249	9,745	112	372	44	17,789	13.3
1959	933	[2] 4,009	[2] 1,799	9,059	102	283	50	16,235	12.3
1960	713	[2] 3,675	[2] 1,537	8,964	97	271	28	15,285	11.2
1961	602	[2] 3,463	[2] 1,468	8,912	88	348	25	14,906	10.7
Imported:[3]									
1958	--------	--------	--------	--------	--------	--------	--------	--------	--------
1959	--------	(4)	--------	--------	--------	--------	--------	(4)	(5)
1960	(4)	(4)	--------	--------	--------	--------	--------	(4)	(5)
1961	(4)	(4)	--------	--------	--------	--------	--------	(4)	(5)
Briquets (domestic use):									
1958	9	3	1	7	(4)	5	1	26	(5)
1959	(4)	(4)	--------	1	--------	1	--------	2	(5)
1960	1	--------	--------	(4)	--------	1	--------	2	(5)
1961	1	--------	--------	(4)	--------	1	--------	2	(5)
Coke (domestic use):									
1958	201	53	146	50	(4)	1	--------	451	.4
1959	162	37	116	34	(4)	--------	--------	349	.3
1960	128	30	98	29	(4)	--------	--------	285	.2
1961	108	26	81	23	(4)	--------	--------	238	.2
Imported:[3]									
1958	--------	13	--------	--------	--------	--------	--------	13	(5)
1959	(4)	15	--------	--------	--------	--------	--------	15	(5)
1960	(4)	1	--------	--------	--------	--------	--------	1	(5)
1961	(4)	2	--------	--------	--------	--------	--------	2	(5)
Oil (heating and range):[6]									
1958	30,289	26,850	10,464	10,553	1,293	4,793	1,309	85,551	63.9
1959	29,066	27,037	10,896	10,543	1,055	3,824	1,155	83,576	63.6
1960	31,008	27,714	11,201	11,510	991	4,135	1,200	87,759	64.0
1961	30,585	29,726	11,366	10,775	787	4,058	1,002	88,299	63.2
Natural gas:[7]									
1958	3,096	10,227	3,103	10,939	(8)	[8] 2,649	(8)	30,014	22.4
1959	3,204	11,017	3,160	11,256	(8)	[8] 2,701	(8)	31,338	23.8
1960	3,516	11,890	3,532	11,913	181	[8] 2,738	(8)	33,770	24.6
1961	3,927	12,834	4,155	12,240	206	[8] 2,887	(8)	36,249	25.9
Total:									
1958	34,628	41,380	15,963	31,294	[9] 1,405	[9] 7,820	[9] 1,354	133,844	100.0
1959	33,365	42,115	15,971	30,893	[9] 1,157	[9] 6,809	[9] 1,205	131,515	100.0
1960	35,366	43,310	16,368	32,416	[9] 1,269	[9] 7,145	[9] 1,228	137,102	100.0
1961	35,223	46,051	17,070	31,950	[9] 1,081	[9] 7,294	[9] 1,027	139,696	100.0

[1] Pennsylvania Department of Mines and Mineral Industries.

[2] An important but undetermined part of anthracite shown as shipped to New Jersey is reshipped to New York City.

[3] U.S. Department of Commerce.

[4] Less than 500 tons.

[5] Less than 0.05 percent.

[6] Converted to coal equivalent upon basis of 4 barrels of fuel oil equaling 1 ton of coal.

[7] Converted to coal equivalent upon basis of 24,190 cubic feet of natural gas equaling 1 ton of coal.

[8] 1958–59, Delaware and the District of Columbia included with Maryland; 1960–61, the District of Columbia included with Maryland.

[9] 1958–59, natural gas for Delaware and the District of Columbia included with Maryland; 1960–61, the District of Columbia included with Maryland.

TABLE 33.—Retail dealer deliveries and consumption of Pennsylvania anthracite in the United tates, 1955-61, by selected consumer categories

(Thousand net tons)

Year	Retail dealer deliveries[1]	Colliery fuel	Rail-roads [2]	Electric utilities [3]	Briquet plants	Cement plants	Iron and steel industry		
							Coke making	Sintering and pel-letizing [4]	Other [5]
1955	13,019	419	457	3,209	264	199	366	385	443
1956	13,018	342	409	3,296	228	244	377	564	625
1957	10,670	279	361	3,363	156	221	389	868	698
1958	9,386	195	335	2,786	120	183	255	685	686
1959	7,562	129	292	2,629	43	159	369	780	683
1960	6,775	102	248	[6] 2,751	31	152	370	754	720
1961	5,070	45	(7)	2,509	28	153	320	588	685

[1] Estimated from reports submitted by a selected list of retail dealers. Does not include local sales.
[2] Association of American Railroads.
[3] Federal Power Commission.
[4] Annual Statistical Report, American Iron and Steel Institute.
[5] Annual Statistical Report, American Iron and Steel Institute. Contains a small but undetermined amount of anthracite used for sintering.
[6] Revised.
[7] Not available.

STOCKS

After decreasing to an alltime low of 199,000 tons at the close of December 1960, stocks of anthracite held by producing companies declined to a new monthly low of only 64,000 tons at the end of February 1961 because of extremely cold weather in January. From this point, stocks held in ground storage rose to about 247,000 tons at the end of May, then dropped to between 170,000 and 180,000 tons during June and July under the stimulus of spring-summer discount prices. Stocks rose steadily thereafter to the year's peak of 297,000 tons at the end of October and then declined to 233,000 tons at the close of the year—about 17 percent more than the producers held at the same time in 1960.

Retail dealers operated throughout 1961 with less stocks than in 1960, but at the end of December, Bureau estimates placed the quantity of anthracite held by retail dealers outside the producing region at a figure only 14,000 tons under the amount in stock at the end of 1960. As in previous years, the low points occurred during the early spring and summer months and the high points during early fall and winter.

Anthracite in the possession of electric utility plants and on the Upper Lake docks were also under 1960 levels. While consumption of anthracite was reduced by about 9 percent (reportedly because conditions for generating hydropower improved and use of other fuels increased), utility plants cut inventories of anthracite by approximately 19 percent between December 1960 and December 1961. This drawdown in stocks (approximately 339,000 tons) not only represented about 14 percent of the 1961 anthracite burned but apparently reflected decreased purchasing by the utilities, less output from their privately owned sources, or both. The decline of approximately 36,000 tons in stocks held at docks on Lakes Superior and Michigan, combined, suggested that shipments and receipts were not entirely adequate to meet 1961 demand in the upper lakes region. Stocks increased slightly at coke plants from about 93,000 tons in December 1960 to approximately 98,000 tons a year later.

FOREIGN TRADE[4]

According to data released by the Bureau of the Census, U.S. Department of Commerce, exports of Pennsylvania anthracite totaled 1,546,000 net tons, a gain of 7 percent over 1960. Virtually all of the increase was attributable to a major rise in European imports and expanding shipments to Asiatic countries. In North American export markets the downward trend in shipments to Canada continued; trade with Cuba was completely suspended; and exports to Mexico increased by a small quantity.

For the first time in decades, exports to Canada totaled less than 1 million tons. The total for 1961 (966,000 tons) represented a loss of 239,000 tons, or 20 percent from 1960. No data are yet available on Canadian consumption of various fuels in 1961; however, the continuing decline in exports of Pennsylvania anthracite to that country undoubtedly reflects the growing use by Canada of the indigenous and imported liquid and gaseous fuels discussed in this section of the Minerals Yearbook, 1960.

The most outstanding development of the year in the trade with Europe was the award of a contract calling for the delivery during fiscal year 1961–62 of approximately 485,000 tons of Egg and Stove sizes to U.S. armed forces in West Germany. Another new market that developed in West Germany was that of using Pennsylvania anthracite for treating iron ore by the Krupp-Renn process. The 221,000 tons shown in table 35 as exported to West Germany probably did not include all shipments to that country, as virtually all German tonnage was destined to ports in the Netherlands, with possibly a small quantity going to Germany through Belgium. For that reason, the tonnages shown for those countries probably was not a true measure of their import requirements. The export volume to France was approximately the same as in 1960 and as in the past few years, largely consisted of Buckwheat Nos. 4 and 5 for use in making briquets and as boiler fuel. Exports to Italy, India, and Viet-Nam also increased by small quantities.

TABLE 34.—Anthracite imported for consumption in the United States, by country and customs districts

(Net tons)

Country and customs district	1960	1961	Country and customs district	1960	1961
Canada to—			Canada to—Continued		
Buffalo	41	----------	Maine and New Hampshire	336	----------
Dakota	----------	19	Montana and Idaho	----------	51
Galveston	----------	57	Washington	1,099	565
Hawaii	----------	100	Total	1,476	792

Source: Bureau of the Census.

---

[4] Figures on imports and exports compiled by Mae B. Price and Elsie D. Jackson, Division of Foreign Activities, Bureau of Mines, from records of the Bureau of the Census.

In 1961 anthracite imported for consumption in the United States totaled only 792 tons, all of which originated in Canada. Imports are shown, by customs districts, in table 34, and exports, by customs districts and countries of destination, in table 35.

TABLE 35.—Anthracite exported from the United States, by countries and customs districts

(Net tons)

Country	1960	1961
North America:		
Canada	[1] 1,204,414	965,576
Cuba	25,315	---
Mexico	1,879	5,783
Total	[1] 1,231,608	971,359
South America:		
Argentina	16	1,901
Brazil	18,175	15,716
Chile	---	297
Colombia	---	45
Paraguay	6	---
Uruguay	497	---
Venezuela	29	40
Total	18,723	17,999
Europe:		
Belgium-Luxembourg	10,328	65,912
Denmark	---	58
France	62,362	64,347
Germany, West	---	220,795
Italy	53,180	68,073
Netherlands	51,830	105,383
Total	177,700	524,568
Asia:		
Cambodia	---	260
India	1,068	9,551
Indonesia	31	65
Israel	20	65
Japan	---	3,746
Korea, Republic of	---	42
Nansei and Nanpo Islands	---	234
Pakistan	---	21
Philippines	29	71
Saudi Arabia	6	---
Viet-Nam	11,169	16,821
Total	12,323	30,876
Oceania: Australia	46	1,602
Africa: United Arab Republic (Egypt Region)	---	84
Grand total	[1] 1,440,400	1,546,488

Customs district	1960	1961
North Atlantic:		
Maine and New Hampshire	85	167
Massachusetts	---	25
New York	1,878	4.757
Philadelphia	[1] 354,205	706,042
South Atlantic: Virginia	1,042	5,134
Gulf Coast:		
New Orleans	---	1,537
Sabine	1,068	9,342
Mexican border:		
Arizona	---	93
El Paso	108	---
Laredo	1,732	5,627
Northern border:		
Buffalo	714,799	567,464
Dakota	31	---
Duluth and Superior	2,508	264
Michigan	347	1,202
Ohio	5,920	650
Rochester	[1] 27,953	3,148
St. Lawrence	322,564	238,465
Vermont	6,160	2,310
Pacific Coast:		
San Diego	---	24
Washington	---	237
Total	[1] 1,440,400	1,546,488

[1] Revised figure.

Source: Bureau of the Census.

WORLD PRODUCTION

World production of anthracite in 1961 declined 1 percent, totaling 190.8 million tons. The trend of output among the major producing countries did not change significantly. Production increased slightly to moderately in some countries and declined by corresponding amounts in others. The leading producing countries in order of tonnage were the Soviet Union, China, United States, West Germany, and France. The combined output of these countries represented 79 percent of total world production. The tonnages produced in the various countries during 1957–61 are listed in table 36.

TABLE 36.—World production of anthracite, by countries [1]
(Thousand short tons)

Country	1957	1958	1959	1960	1961
Belgium	9,827	7,541	7,059	6,488	6,085
Bulgaria [2]	150	165	165	165	165
China [2]	5,700	11,000	22,000	24,800	22,000
France	13,356	13,529	13,785	[2] 12,125	[2] 11,400
Germany:					
East [2]	275	275	275	275	275
West	13,338	13,900	13,900	[2] 13,300	[2] 13,800
Ireland	183	186	164	175	219
Italy	61	49	34	22	26
Japan	1,852	1,811	1,781	1,987	2,088
Korea:					
North [2]	3,300	4,400	5,500	6,600	7,700
Republic of	2,691	2,944	4,559	5,897	6,486
Morocco	574	562	513	454	452
Netherlands [2]	4,300	4,400	4,400	4,400	4,400
New Zealand	2	2	2	1	1
Peru	19	62	64	31	22
Portugal	550	625	581	480	500
Rumaina [2]	17	17	17	17	17
Spain	3,129	3,440	2,888	2,771	2,848
Switzerland [2]	11	11	11	11	11
Union of South Africa	[3] 484	[3] 477	656	709	1,430
U.S.S.R.	79,953	86,121	87,423	85,995	[2] 86,500
United Kingdom	4,476	4,418	4,039	4,026	[2] 4,000
United States (Pennsylvania)	25,338	21,171	20,649	18,817	17,446
Viet Nam:					
North	1,200	1,980	2,427	2,682	[2] 2,900
South	13	22	22	30	[2] 33
World total (estimate) [1]	170,800	179,100	192,900	192,300	190,800

[1] This table incorporates a number of revisions of data published in previous Anthracite chapters. Data do not add to totals shown because of rounding where estimated figures are included in the detail.
[2] Estimate.
[3] Reported as sales.

NOTE: An undetermined quantity of semianthracite is included in the figures for some countries.

Compiled by Pearl J. Thompson, Division of Foreign Activities.

TECHNOLOGY

Mining.—After the successful demonstration in 1960 of the feasibility of cutting and breaking anthracite with a high-pressure water jet, the Bureau-designed, prototype hydraulic mining system and equipment was placed in operation at the end of August in an anthracite mine of a cooperating producer. The bed worked is 12 to 14 feet thick with a pitch of about 15° to 20°. During 30 operating shifts, 57 feet of a 22-foot-wide chamber and 38 feet of 12-foot-wide crosscut were mined with the hydraulic jumbo without any drilling, blasting, or machine cutting. Because of delays, the largest of which was for moving coal from the face, the jumbo averaged only 52 minutes of operation per shift. The hydraulic mining rate was 0.71 ton per minute of cutting time and the overall power requirement, 18.6 kilowatt-hours per ton. A $^{25}/_{64}$-inch nozzle, with a discharge rate of 300 gallons per minute, was used to maintain pump pressure at 5,000 pounds per square inch.

In efforts to increase cutting time per shift, a specially designed L-shaped face conveyor will be used to remove the coal as it is broken at the face. Likewise, timbering time will be reduced by constructing a timber cradle on the monitor for lifting and holding crossbars to the roof. These and other proposed improvements are expected to increase cutting time greatly.

Research on hydraulic hoisting of solid materials by pipeline was advanced by rearranging the experimental lock-hopper-feed apparatus at the Bureau Anthracite Research Center, Schuylkill Haven, Pa. The pressure vessels for feeding coal into the hoisting system were aligned horizontally so as to reduce the amount of headroom required. The coal is discharged directly from a 10-inch gate through short transition elbows into a 6-inch hoisting line. Capacity of the new horizontal arrangement was shown to be 35 tons per hour, when the maximum size of anthracite was 2 inches. Experiments showed that a 2-inch increase in the diameters of the discharge gates and pipeline would increase capacity by 60 percent. The rigid connection to the actuating cylinder was replaced by a flexible one, thus improving the functioning of the air-operated gates on the pressure vessels.

The trend toward using larger capacity equipment in anthracite stripping was accelerated in 1961. A 35-cubic-yard walking-dragline, the largest in the country at the time, was put in operation in the 1950's. Later a larger walking-dragline with a bucket capacity of 50 tons of rock was installed. Haulage equipment[5] also has been increased in size. Off-road trucks of 32-ton capacities are common, and several operations use trucks with a capacity of 60 tons. The largest haulage units in use at anthracite strippings have capacities of 80 tons.

Mine-Water Control.—Under the joint Federal-State Anthracite Mine Water Control Program established in 1955, a total of 29 control projects had been approved for Federal participation up to the close of 1961. Of these, four projects were cancelled before any public funds were expended and an additional three projects were terminated owing to economic conditions and the changed water problems subsequent to the Knox mine-flood disaster in 1959.

A total of 29 vertical turbine-type (deep-well) pumps, with an aggregate capacity of 143,000 gallons per minute, was supplied to control the levels of underground pools. Surface drainage improvements (14 projects) constructed under the program were estimated to prevent nearly 3 billion gallons of surface water from seeping into underlying mine workings each year. These surface improvements not only protect anthracite reserves but also serve as antipollutant measures for the streams of the anthracite region.

Activity of the program in 1961 ebbed because the economic status of the anthracite industry became worse. One project, a surface drainage improvement, was approved during the year.

Preparation.—Bureau investigations showed that the heavy-medium process is efficient for cleaning the smaller sizes of anthracite when the feed material is uniformly sized. Rice-size anthracite (−5/16—+3/16-inch; ash content, 22 to 35 percent) was cleaned in equipment operated at constant drum speed, pump speed, and medium density. The resulting product contained 8.1 to 9.8 percent ash. Recovery of product ranged from 65.5 to 81.0 percent.

Froth flotation tests conducted by the Bureau on anthracite having 97 percent minus 400-mesh fines and an ash content of 29 percent yielded a product that contained 11.4 percent ash at a recovery of 70 percent. The tests showed that feed size, pulp density, pH, and type and quantity of reagent had definite effects upon product recovery and ash content.

---

[5] Jones, Don C. Job-Designed Off-Road Haulers: Mechanization. V. XXV, No. 11, November 1961, pp. 57–60.

The first completely automated heavy-medium system [6] at an anthracite preparation plant in the United States maintains specific gravity of the water-magnetite medium within ±0.003. Gamma radiation from cesium 137 is used to determine the gravity and to activate electrical controls and valves, which add magnetite or water to maintain the set gravity for optimum operations. Magnetite requirements of the plant are claimed to be 0.4 pound or less per ton of raw coal feed.

In 1961 new preparation equipment was contracted [7] for five anthracite preparation plants. This equipment had a total capacity of 340 tons per hour. In addition, cyclones were added at one plant and revolving feed distributors at another.

Utilization.—Basic research on the fundamental chemical structure and physical properties of anthracite was continued at the Bureau Research Center at Schuylkill Haven. Data were published [8] on yields and elemental chemical analyses of organic materials obtained by oxidizing anthracite with concentrated nitric acid.

In investigating the electrical characteristics of anthracite, procedures, techniques, and circuit components were developed for studies of such properties as the electrical resistivity, dielectric constant, and dissipation factor.

A gammacell 220 with a 23,000-curie cobalt 60 source was installed at the Center. Anthracite absorbed oxygen at a faster rate in the radiation chamber than in normal atmosphere. Gamma radiation affected the composition of gases evolved from anthracite by increasing the percentages of hydrogen and carbon dioxide over those from samples not irradiated. Carbon monoxide was found only in gases from the anthracite that was not irradiated. Other gases from samples that were both irradiated and unirradiated were present in about the same order of magnitude. Radiation appeared to have no effect on the total volume of gases evolved.

A briquetted metallurgical fuel composed predominantly of anthracite was studied.[9] Briquets made from a mixture of 82 percent anthracite fines, 10 percent bituminous coal, and 8 percent coal-tar pitch had strength characteristics superior to coke. The briquets were formed at a pressure of 3,000 pounds per square inch and calcined for 4 hours, starting with room temperature and reaching a maximum of 1,750° F. Either direct of indirect calcining methods are satisfactory when the heating rates are held between 10° and 25° F per minute.

---

[6] Mechanization. Automated Heavy-Media System. V. XXV, No. 1, January 1961, pp. 49–51.

[7] Coal Age. 1961 Preparation Sales. V. 67, No. 2, February 1962, pp. 84–85.

[8] Hammer, M. A., G. A. Brady, and J. W. Eckerd. Oxidation of Anthractie With Concentrated Nitric Acid. BuMines Rept. of Inv. 5782, 1961, 18 pp.

[9] Sanner, W. S., R. E. McKeever, and J. W. Eckerd. Agglomerating Anthracite for Metallurgical Fuel, BuMines Rept. of Inv. 5843, 1961, 42 pp.

Approximately 180 tons of pillow- and 110 tons of bolster-shaped briquets were made in the pilot plant and calcined in pot furnaces at the Research Center. These briquets were to be used in smelting tests in the Bureau experimental blast furnace and in pressure-drop tests in a simulated metallurgical stock column.

Experiments in the Center's simulated metallurgical shaft disclosed that the pressure drop was 62 percent less when loaded by bucket than when loaded by hand. The furnace burden was a mixture of carbonized pillow-shaped anthracite briquets, limestone, and iron ore.

Coke and Coal Chemicals

By J. A. DeCarlo,[1] T. W. Hunter,[2] and Maxine M. Otero[3]

Contents

Page
General summary 203
Salient statistics 206
Statistical summary 207
Scope of report 209
Oven and beehive coke and breeze 210
Monthly production 210
Production by merchant and furnace plants 211
Production by States 213
Coke breeze 214
Number and type of ovens 216
Quantity and value of coal carbonized 220
Preparation and source of coal 223
Consumption of coke 227

Oven and beehive coke and breeze—Continued

Page
Distribution of oven and beehive coke 232
Stocks of coke and coking coal 234
Value and price 236
Foreign trade 237
Technology 240
World review 245
Coal-chemical materials 248
General summary 248
Coke-oven gas 252
Crude coal tar and derivatives 255
Coke-oven ammonia 258
Crude light oil and derivatives 258

GENERAL SUMMARY

PRODUCTION of oven and beehive coke in the United States in 1961 decreased 10 percent from the 1960 total and 16 percent from the average for the 1957–59 base period. The general recession in industrial activity, beginning in the last half of 1960, continued through the first quarter of 1961. During this period the monthly production index on oven coke (1957–59=100) averaged 69. In subsequent quarters, a slight but steady gain in industrial activity resulted in a corresponding rise in oven operations, and the monthly production index advanced to 81 in the second quarter, climbed to 88 in the third quarter, and reached 98 in the last quarter. The December 1961 coke output was the highest since May 1960. Slot-type coke ovens continued to serve as the major source of metallurgical fuel in the United States and furnished 98 percent of the total supply of oven and beehive coke. Production of coke from beehive ovens decreased 13 percent from 1960, and monthly output generally followed the oven-coke production pattern. However, peak monthly output of beehive coke was attained in August when 84,200 tons was produced. This was only 81 percent of the average monthly production in the 1957–59 period.

Demand for both coke and screenings or breeze was good throughout the year, and stocks of coke at producers' plants decreased 15 percent.

---

[1] Chief, Section of Coke and Coal Chemicals.
[2] Chief, Branch of Bituminous Coal Economics.
[3] Supervisory statistical assistant.

The apparent consumption of coke, however, was only 9 percent below the 1960 total. Blast furnaces continued to utilize the bulk of the coke supply and consumed about 90 percent of the United States consumption. Because coke is one of the major items that determine steel-making costs, blast-furnace coke rates are extremely important to iron and steel producers. In the past decade more investigative and research work was done to increase blast-furnace productivity and reduce coke rates than in any comparable period in the steel industry's history. Since 1950, coke rates declined about 25 percent largely through improvements in ore burdens (sinter and pellets); better uniformity of the chemical and physical properties of coke; and changes in other operating variables of the blast furnace, such as higher blast temperatures, oxygen enrichment of the blast, and higher dome pressures. An alltime low coke rate of 1,432.6 pounds of coke per ton of pig iron and ferroalloys was reached in 1961. Although there were not enough blast furnaces converted to full-scale use of supplemental fuel injection (gaseous, liquid, or pulverized solid fuels) to effect the coke rate in 1961, results obtained from furnaces that were using fuel injection clearly showed a substantial reduction in coke rates. The wide-scale adoption of this blast-furnace innovation in the future could lower coke rates substantially below the 1961 level.

Another metallurgical application that requires high-quality large-size coke is the melting of pig iron and scrap in foundry cupolas. The market for foundry coke, although lower than in the mid-1950's, remained fairly stable in 1961 and accounted for 4 percent of the total consumption. Decreases occurred in deliveries to producer- and water-gas plants, other industrial plants, and for residential heating.

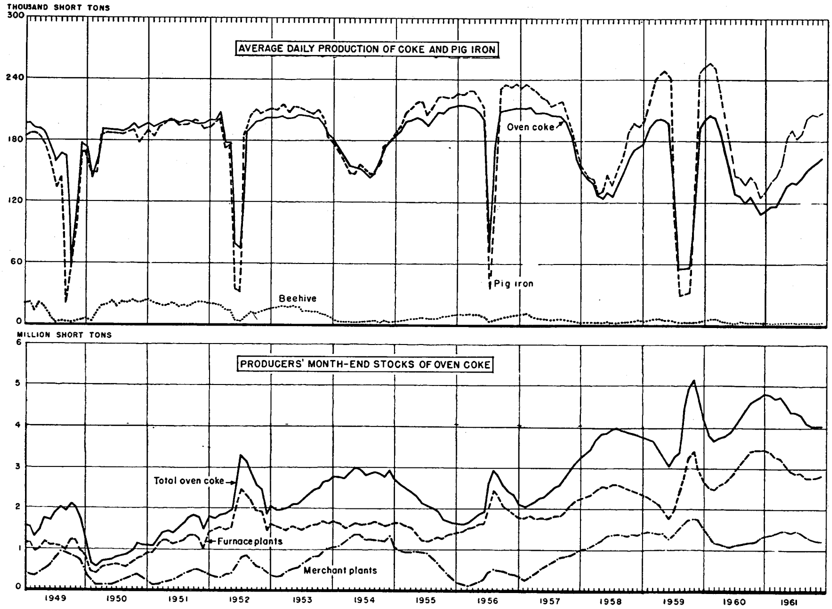

FIGURE 1.—Average daily production of oven and beehive coke and pig iron and producers' stocks of oven coke, by months.

Deliveries to gas plants and to the residential-heating trade were small and together represented only about 1 percent of all coke consumption. Shipments to other industrial plants including coke used for chemical processing, nonferrous smelting, and for various other industrial purposes decreased 15 percent from 1960 and represented 4 percent of the total movement.

Production of coke screenings or breeze also declined in 1961, dropping 9 percent from 1960. Producing companies continued to use most of the breeze recovered and sold less than one-fourth of the total supply in 1961. The consuming pattern, however, continued to shift, with greater quantities moving to agglomerating plants, principally for sintering iron ore, and less to steam plants. According to data supplied to the Bureau of Mines, approximately 57 percent of the more than 2.6 million tons of screenings or breeze used by producers was used for agglomerating iron ore, 24 percent was used for steam raising, and 19 percent for various other industrial purposes. Demand for breeze for chemical processing, particularly by elemental phosphorus producers, was firm throughout the year, and prices increased slightly.

The increases in requirements of small sizes of coke for chemical processing in recent years resulted in significant developments in carbonizing techniques. By the end of 1961, at least 9 different plants, with a combined annual coke capacity in excess of 380,000 tons, were either in commercial production or under construction. Carbonizing equipment employed in these plants differed markedly from the conventional slot-type and beehive-coke ovens. Among the approaches taken to produce "chemical coke" were a multi-stage formed-coke process, various modifications of the Shawinigan chain-grate process, a coal-pelletizing process, and other processes designed to produce suitable coke for the electrochemical and electrometallurgical industries.

A noteworthy accomplishment of the coal and coke industries in 1961 was the slight reduction in bituminous-coal costs at coke plants. Although wages and transportation costs increased during 1961, the delivered cost of bituminous coal to oven-coke plants declined $0.10 per ton from 1960 and $0.01 per ton at beehive plants. Because of the transportation charges on coal delivered to oven-coke plants, this coal was about one-third higher than for beehive plants.

Production of gas and coal-chemical materials (ammonia, crude light oil, and crude tar) all registered decreases in 1961 as compared to 1960. The decreases ranged from 6 percent for ammonium sulfate equivalent to 9 percent for crude light oil. The reduced supply of the basic chemical raw materials resulted generally in decreases in derived products. Although output of ammonium sulfate and ammonia liquor decreased, diammonium and monoammonium phosphate increased 3 percent; benzene, the principal light-oil derivative, decreased 11 percent; toluene, 7 percent; xylene, 6 percent; and solvent naphtha, 2 percent. Tar products that showed decreases were creosote oil, which dropped 5 percent, and naphthalene, which dropped 12 percent; but pitch increased 13 percent.

Most of the coal chemical sales were slightly below production, and inventories increased accordingly. Stocks of ammonium sulfate increased 40 percent during 1961 because of the slackening in sales in the last half of the year. However, one of the ammonia products on which sales exceeded production was diammonium phosphate. Although sales of sulfate and ammonia liquor lagged, the average price f.o.b. plant of these two products, as well as diammonium phosphate, increased over the 1960 figures. Supply and demand of the principal light-oil derivatives were in balance, but the price of benzene was cut $0.03 per gallon in July. Probably the most significant development concerning benzene was the large volume exported in 1961. For the first time in many years, benzene exports exceeded imports. Until 1961, the United States was a net importer of benzene and during the mid-1950's obtained as much as one-fifth of total national requirements from foreign sources. Naphthalene was one of the major aromatic chemicals that was in tighter supply than any other. One of the factors that kept naphthalene in tight supply was the low operating rate of oven-coke plants in the last half of 1960 and the first half of 1961. Because of this low production, imports increased 146 percent over 1960 and reached 101,771,648 pounds. Of significance, however, was the production of petroleum naphthalene for the first time in the United States. The Ashland Oil and Refining Co. was the first petroleum refining company to make naphthalene from petroleum feed stocks when it started a 75-million-pound-per-year plant near Catlettsburg, Ky., early in 1961. Several other petroleum refiners were awarded contracts for the construction of facilities to produce petroleum naphthalene. To be completed late in 1962, the facilities were expected to raise the petroleum-naphthalene capacity to approximately 400 million pounds per year.

The total value of coal carbonized in 1961 decreased 10 percent from 1960 and totaled $720,983,921. The value of all coke-oven products produced and sold amounted to $1,222,891,548 or 70 percent more than the value of the coal. The value of coke and breeze amounted to 77 percent of the value of all products; coal-chemical materials, including surplus gas, comprised the balance.

SALIENT STATISTICS

TABLE 1.—Salient coke statistics in the United States

	1957–59 (average)	1960	1961
United States:			
Production:			
Oven coke .... short tons..	60,551,900	56,219,108	50,830,409
Beehive coke .... do....	1,254,232	1,009,610	880,778
Total .... do....	61,806,132	57,228,718	51,711,187
Imports .... do....	120,908	[1] 126,345	126,518
Exports .... do....	558,428	353,016	445,232
Producers' stocks, Dec. 31 .... do....	[2] 4,682,436	4,738,088	4,041,873
Consumption, apparent .... do....	60,585,947	[1] 56,946,395	52,088,688
Ovens:			
Slot-type, in existence, Dec. 31	[2] 15,993	[1] 15,320	15,224
Beehive, in existence, Dec. 31	[2] 7,448	7,583	5,702
Value of coal-chemical material used or sold	$330,902,284	$306,745,388	$279,349,011
Value of coke and breeze produced	$1,143,589,918	$1,075,444,111	$943,542,537
Total value of all products	$1,474,492,202	$1,382,189,499	$1,222,891,548
World production:			
Hard coke .... thousand short tons..	287,855	308,209	305,961
Gashouse and low-temperature coke .... do....	51,130	51,300	50,430

[1] Revised figure.
[2] 1959.

STATISTICAL SUMMARY

TABLE 2.—Statistical summary of the coke industry in the United States in 1961

	Slot-type ovens	Beehive ovens	Total
Coke produced:			
At merchant plants:			
Short tons	5,490,047	(2)	(2)
Value	$118,950,630		
At furnace plants:[1]			
Short tons	45,340,362		
Value	$785,982,543		
Total:			
Short tons	50,830,409	880,778	51,711,187
Value	$904,933,173	$13,285,323	$918,218,496
Breeze produced:			
Short tons	3,337,164	53,525	3,390,689
Value	$25,105,829	$218,212	$25,324,041
Coal carbonized:			
Bituminous:			
Short tons	72,385,040	1,496,106	73,881,146
Value	$708,507,117	$9,123,054	$717,630,171
Average per ton	$9.79	$6.10	$9.71
Anthracite:			
Short tons	320,125	---	320,125
Value	$3,353,750	---	$3,353,750
Average per ton	$10.48	---	$10.48
Total:			
Short tons	72,705,165	1,496,106	74,201,271
Value	$711,860,867	$9,123,054	$720,983,921
Average per ton	$9.79	$6.10	$9.72
Average yield in percent of total coal carbonized:			
Coke	69.91	58.87	69.69
Breeze (at plants actually recovering)	4.59	4.85	4.59
Coke used by producing companies:			
In blast furnaces:			
Short tons	44,895,533	(3)	44,895,533
Value	$775,529,267	(3)	$775,529,267
In foundries:			
Short tons	226,422	---	226,422
Value	$7,162,430	---	$7,162,430
For producer- and water-gas manufacture:			
Short tons	69,932	---	69,932
Value	$1,179,018	---	$1,179,018
For other industrial uses:			
Short tons	410,396	(3)	410,396
Value	$7,509,294	(3)	$7,509,294
Breeze used by producing companies:			
In steam plants:			
Short tons	619,458	---	619,458
Value	$4,360,263	---	$4,360,263
In agglomerating plants:			
Short tons	1,518,930	---	1,518,930
Value	$12,766,573	---	$12,766,573
For other industrial uses:			
Short tons	506,746	---	506,746
Value	$2,676,311	---	$2,676,311
Coke sold (commercial sales):			
To blast furnaces:			
Short tons	2,342,765	344,241	2,687,006
Value	$37,442,717	$5,260,080	$42,702,797
Average per ton	$15.98	$15.28	$15.89
To foundries:			
Short tons	2,086,797	5,565	2,092,362
Value	$62,752,266	$89,164	$62,841,430
Average per ton	$30.07	$16.02	$30.03
To water-gas plants:			
Short tons	34,739	---	34,739
Value	$638,075	---	$638,075
Average per ton	$18,37	---	$18.37
To other industrial plants:			
Short tons	1,141,765	526,747	1,668,512
Value	$18,977,302	$7,872,266	$26,849,568
Average per ton	$16.62	$14.95	$16.09
For residential heating:			
Short tons	324,879	(4)	324,879
Value	$5,562,899	(4)	$5,562,899
Average per ton	$17.12	(4)	$17,12

See footnotes at end of table.

TABLE 2.—Statistical summary of the coke industry in the United States in 1961—Continued

	Slot-type ovens	Beehive ovens	Total
Breeze sold (commercial sales):			
Short tons	762,871	44,927	807,798
Value	$6,550,092	$158,553	$6,708,645
Average per ton	$8.59	$3.53	$8.30
Coal-chemical materials:			
Crude tar:			
Production gallons	663,377,790		663,377,790
Yield per ton of coal do	8.71		8.71
Ammonia:[5]			
Production short tons	693,064		693,064
Yield per ton of coal pounds	19.42		19.42
Crude light oil:			
Production gallons	214,002,542		214,002,542
Yield per ton of coal do	3.00		3.00
Gas:			
Production M cubic feet	777,948,787		777,948,787
Yield per ton of coal do	10.70		10.70
Burned in coking process percent	35.57		35.57
Surplus used or sold do	62.98		62.98
Wasted do	1.45		1.45
Value of coal-chemical materials sold:			
Crude tar and derivatives:			
Used	$23,840,686		$23,840,686
Sold	$70,102,126		$70,102,126
Ammonia products[6]	$23,048,159		$23,048,159
Crude light oil and derivatives[7]	$48,059,344		$48,059,344
Surplus gas	$114,298,696		$114,298,696

[1] Plants associated with iron blast furnaces (refer to definition in Scope of Report).
[2] Not separately recorded.
[3] Included with sales to avoid disclosing individual company figures.
[4] Included with sales "To other industrial plants" to avoid disclosing individual company figures.
[5] In terms of sulfate equivalent.
[6] Includes ammonium sulfate, ammonia liquor (NH_3 content), and di- and mono-ammonium phosphate.
[7] Includes intermediate light oil.

TABLE 3.—Summary of oven-coke operations in the United States in 1961, by States

State	In existence Dec. 31[1]		Coal carbonized (short tons)	Yield of coke from coal (percent)	Coke produced (short tons)	Value of coke at ovens	
	Plants	Ovens				Total	Per ton
Alabama	7	1,516	5,395,530	73.21	3,949,927	$83,339,880	$21.10
California, Colorado, and Utah	4	829	4,781,978	63.10	3,017,217	73,864,736	24.48
Connecticut, Maryland, New Jersey, and New York	6	1,741	8,901,673	70.04	6,234,321	104,722,267	16.80
Illinois	6	568	2,703,113	68.12	1,841,273	35,416,194	19.23
Indiana	5	2,218	10,843,269	70.71	7,666,870	132,999,987	17.35
Kentucky, Missouri, Tennessee, and Texas	5	420	2,457,783	70.39	1,730,069	31,491,057	18.20
Michigan	4	708	4,088,718	72.35	2,958,342	51,460,209	17.39
Minnesota and Wisconsin	4	400	966,385	73.86	713,769	17,157,543	24.04
Ohio	14	2,413	9,574,548	70.01	6,703,475	112,869,832	16.84
Pennsylvania	12	3,720	19,045,296	69.94	13,320,866	215,005,692	16.14
West Virginia	4	691	3,946,872	68.26	2,694,280	46,605,776	17.30
Total 1961	71	15,224	72,705,165	69.91	50,830,409	904,933,173	17.80
At merchant plants	18	1,890	7,682,794	71.46	5,490,047	118,950,630	21.67
At furnace plants	53	13,334	65,022,371	69.73	45,340,362	785,982,543	17.34
Total 1960	73	[2]15,320	79,743,529	70.50	56,219,108	1,033,167,857	18.38

[1] Excludes plants retired permanently during year.
[2] Revised figure.

TABLE 4.—Summary of beehive-coke operations in the United States in 1961, by States

State	In existence Dec. 31[1]		Coal carbonized (short tons)	Yield of coke from coal (percent)	Coke produced (short tons)	Value of coke at ovens	
	Plants	Ovens				Total	Per ton
Pennsylvania	27	4,493	735,483	61.73	453,989	$6,248,436	$13.76
Kentucky, Virginia, and West Virginia	9	1,209	760,623	56.11	426,789	7,036,887	16.49
Total 1961	36	5,702	1,496,106	58.87	880,778	13,285,323	15.08
Total 1960	43	7,583	1,641,410	61.51	1,009,610	14,752,563	14.61

[1] Excludes plants retired permanently during year.

SCOPE OF REPORT

This chapter on high-temperature oven and beehive coke and related products continues through 1961 the annual statistical series of the coke industry begun by the Geological Survey in 1882 and taken over by the Bureau of Mines in 1925. All data, except where otherwise noted, were voluntarily supplied to the Bureau of Mines by coke-producing companies in the United States. Only products made in high-temperature slot-type and beehive-coke ovens are included; products made by other carbonization processes (coal-gas retorts, low-temperature carbonization of coal, and carbonization of residues from refining coal tar and petroleum) are specifically excluded.

In recent years there has been considerable research on the development of new carbonizing processes. In 1961 at least 9 companies had completed, or were constructing, pilot-scale and, in some instances, commercial-scale plants employing new carbonizing equipment such as fluid-bed carbonizers, chain-grate cokers, rotary-hearth continuous coke ovens, and other methods. A survey of these plants was made early in 1962 to determine the status of each installation, and replies were received from all companies. Salient statistics on these plants cannot be published at this time because some plants are still in the experimental stage. When enough companies are in commercial production, a summary table will be published in this annual coke and coal-chemicals report.

Production of petroleum coke (including catalyst coke) totaled 15.1 million tons in 1961, and output of coal-tar-pitch coke, as reported by the U.S. Tariff Commission, totaled 13,000 short tons.

In 1961 the Bureau of Mines canvassed 74 oven-coke plants and 1 light-oil plant, which refined light oil produced at affiliated coke plants. Of the oven-coke plants canvassed, 64 were active all year, 4 were idle all year, 6 were active part of the year, and 2 were closed permanently. In the beehive branch of the coke industry, questionnaires were mailed to 32 companies that owned 40 plants. Returns showed that only 11 plants operated the entire year, 6 plants were active part of the year, and 23 plants were idle the entire year.

The terms "merchant" and "furnace" plants in this chapter apply only to oven-coke plants. Furnace plants are those that are owned by or financially affiliated with iron and steel companies who produce coke mainly for use in their own blast furnaces. All other coke plants, classified as merchant, include those that manufacture metallurgical, industrial, and residential-heating grades of coke for sale on the open market; those associated with chemical companies or gas utilities; and those affiliated with local iron works, where only a small part (less than 50 percent of output) is used in affiliated blast furnaces.

For the first time since 1920, annual coke capacities of beehive- and oven-coke plants are not shown in this report. Capacity data were omitted because a large segment of the oven-coke industry reported to the Bureau that this information was not available for 1961.

The Bureau of Mines does not collect data on the manufacturing costs of coke and coal chemicals. The average values for coal that are shown in this report are based on the market values assigned by the coke-producing companies to all coal delivered to the plants whether obtained from captive mines or purchased from commercial mines. The average values at plants of oven and beehive coke produced (including coke consumed by producing companies and coke sold) are based on reports from producing companies that showed receipts, f.o.b. plant, for commercial sales of coke and the prevailing market values assigned by the producer for coke consumed by the producing companies. The average values for the coal chemicals are based on the total realization, f.o.b. plant, for commercial sales of the various commodities.

As used in this chapter, coke refers only to large sizes (usually one-half inch plus), from which smaller sizes (known as breeze) have been screened. Metallurgical coke refers to grades used for smelting and casting ferrous metals in blast furnaces and foundries. The standard unit of measurement in the coke industry is the net or short ton of 2,000 pounds, which is used throughout this chapter.

OVEN AND BEEHIVE COKE AND BREEZE

MONTHLY PRODUCTION

TABLE 5.—Production of oven and beehive coke in the United States [1]

(Short tons)

Month	1957-59 (average)		1960		1961	
	Total	Daily average	Total	Daily average	Total	Daily average
Oven coke:						
January	5,630,000	181,600	6,203,700	200,100	3,494,400	112,700
February	5,159,400	184,300	5,936,000	204,700	3,297,800	117,800
March	5,744,700	185,300	6,261,600	202,000	3,655,300	117,900
April	5,378,300	179,300	5,672,200	189,100	3,798,700	126,600
May	5,532,400	178,500	5,290,600	170,700	4,251,100	137,100
June	5,352,800	178,400	4,558,000	152,000	4,211,300	140,400
July	4,603,300	148,500	3,987,100	128,600	4,320,200	139,400
August	4,151,700	133,900	3,935,900	127,000	4,465,700	144,100
September	4,121,500	137,400	3,604,500	120,100	4,558,400	152,000
October	4,340,000	140,000	3,891,400	125,600	4,863,800	156,900
November	5,002,600	166,800	3,496,100	116,600	4,822,300	160,700
December	5,535,200	178,500	3,382,000	109,100	5,091,400	164,300
Total	60,551,900	165,900	56,219,100	153,600	50,830,400	139,300

[1] Daily average calculated by dividing monthly production by number of days in month.

TABLE 5.—Production of oven and beehive coke in the United States—Continued

Month	1957-59 (average)		1960		1961	
	Total	Daily average	Total	Daily average	Total	Daily average
Beehive coke:						
January	132,200	4,300	121,000	3,900	63,100	2,100
February	127,900	4,500	132,100	4,500	60,300	2,100
March	150,300	4,900	139,600	4,500	68,500	2,200
April	138,900	4,600	104,400	3,500	66,200	2,200
May	118,700	3,800	80,900	2,600	80,700	2,600
June	107,900	3,600	60,500	2,000	78,500	2,600
July	80,000	2,600	52,700	1,700	72,300	2,300
August	82,600	2,700	78,100	2,500	84,200	2,700
September	78,600	2,600	62,300	2,100	73,000	2,400
October	75,300	2,400	56,600	1,800	81,000	2,600
November	76,100	2,500	60,900	2,100	75,000	2,500
December	85,700	2,800	60,500	1,900	78,000	2,500
Total	1,254,200	3,400	1,009,600	2,800	880,800	2,400
Total:						
January	5,762,200	185,900	6,324,700	204,000	3,557,500	114,800
February	5,287,300	188,800	6,068,100	209,200	3,358,100	119,900
March	5,895,000	190,200	6,401,200	206,500	3,723,800	120,100
April	5,517,200	183,900	5,776,600	192,600	3,864,900	128,800
May	5,651,100	182,300	5,371,500	173,300	4,331,800	139,700
June	5,460,700	182,000	4,618,500	154,000	4,289,800	143,000
July	4,683,300	151,100	4,039,800	130,300	4,392,500	141,700
August	4,234,300	136,600	4,014,000	129,500	4,549,900	146,800
September	4,200,100	140,000	3,666,800	122,200	4,631,400	154,400
October	4,415,300	142,400	3,948,000	127,400	4,944,800	159,500
November	5,078,700	169,300	3,557,000	118,700	4,897,300	163,200
December	5,620,900	181,300	3,442,500	111,000	5,169,400	166,800
Total	61,806,100	169,300	57,228,700	156,400	51,711,200	141,700

PRODUCTION BY MERCHANT AND FURNACE PLANTS

Statistics showing the production of oven coke separated according to furnace and nonfurnace (merchant) plants are shown in tables 6 and 7. Trends in production for the two groups during the past three decades are illustrated in figure 2. The proportion of coke produced by nonfurnace plants decreased from a high of 37.5 percent in 1934 to 10.8 percent in 1961, an alltime low. The principal factors that contributed to this decline were the substitution of natural gas and fuel oil for coke-oven gas and coke in the chemical-process industries and for residential heating. For example, in 1934, 59 oven-coke plants including 22 furnace plants were distributing coke-oven gas for city distribution, and 70 plants including 30 furnace plants sold 10,174,114 tons of coke for residential heating. In 1961, only 12 plants including 3 furnace plants distributed gas through city mains, and sales of "domestic coke" were down to 324,879 tons. Also, not one synthetic ammonia plant in 1961 used coke for making synthesis gas, a market that consumed more than 1½ million tons annually between 1945 and 1950. The losses of these prime markets to coke producers made it difficult for the merchant plants to continue operation. Furnace plants could direct their surplus gas, formerly sold for city distribution, to their steel furnaces, and coke production could be used in their blast furnaces and for other industrial applications within the plant. Consequently, 24 merchant coke plants closed permanently between 1934 and 1961. The latest merchant plant to retire its ovens was the Philadelphia Electric Company, which discontinued coking operations on May 16, 1961.

The volume of production at merchant plants in 1961 was 64 percent below the high of 1942. Output at furnace plants was also 30 percent lower than the peak attained in 1957. The decline in coke output at furnace plants in the 1960's was due to the reduced operating rates of blast furnaces and to the lower coke-to-hot-metal ratio. These developments caused nine furnace plants to suspend oven operations between 1951 and 1961. Of the nine plants that have discontinued coke production, five have retired their ovens permanently and four were idle but in standby condition at the end of 1961.

TABLE 6.—Production of oven coke in the United States, by type of plant.

(Short tons)

Month	1957-59 (average)		1960		1961	
	Merchant plants	Furnace plants	Merchant plants	Furnace plants	Merchant plants	Furnace plants
Production:						
January	705,700	4,924,300	649,400	5,554,300	467,400	3,027,000
February	641,100	4,518,300	618,500	5,317,500	425,100	2,872,700
March	681,400	5,063,300	654,600	5,607,000	463,400	3,191,900
April	612,900	4,765,400	616,500	5,055,700	469,600	3,329,100
May	609,800	4,922,600	534,800	4,755,800	474,200	3,776,900
June	575,800	4,777,000	497,200	4,060,800	455,400	3,755,900
July	569,100	4,034,200	465,700	3,521,400	416,500	3,903,700
August	573,200	3,578,500	466,600	3,469,300	425,100	4,040,600
September	572,900	3,548,600	443,900	3,160,600	436,500	4,121,900
October	586,000	3,754,000	497,200	3,394,200	465,600	4,398,200
November	582,700	4,419,900	455,800	3,040,300	475,600	4,346,700
December	649,000	4,886,200	464,300	2,917,700	515,600	4,575,800
Total	7,359,600	53,192,300	6,364,500	49,854,600	5,490,000	45,340,400
Daily average:						
January	22,800	158,800	20,900	179,200	15,100	97,600
February	22,900	161,400	21,300	183,400	15,200	102,600
March	22,000	163,300	21,100	180,900	14,900	103,000
April	20,400	158,900	20,600	168,500	15,600	111,000
May	19,700	158,800	17,300	153,400	15,300	121,800
June	19,200	159,200	16,600	135,400	15,200	125,200
July	18,400	130,100	15,000	113,600	13,500	125,900
August	18,500	115,400	15,100	111,900	13,700	130,400
September	19,100	118,300	14,800	105,300	14,600	137,400
October	18,900	121,100	16,100	109,500	15,000	141,900
November	19,400	147,400	15,200	101,400	15,800	144,900
December	20,900	157,600	15,000	94,100	16,700	147,600
Average for year	20,200	145,700	17,400	136,200	15,100	124,200

TABLE 7.—Production of oven coke and number of plants in the United States, by type of plant

Year	Number of active plants [1]		Coke produced (short tons)		Percent of production	
	Merchant plants	Furnace plants	Merchant plants	Furnace plants	Merchant plants	Furnace plants
1929	41	46	12,187,439	41,224,387	22.8	77.2
1939	39	45	11,070,506	31,811,807	25.8	74.2
1957-59 (average)	[2] 21	[2] 54	7,359,600	53,192,300	12.2	87.8
1960	19	53	6,364,540	49,854,568	11.3	88.7
1961	18	52	5,490,047	45,340,362	10.8	89.2

[1] Includes plants operating any part of year.
[2] Dec. 31, 1959.

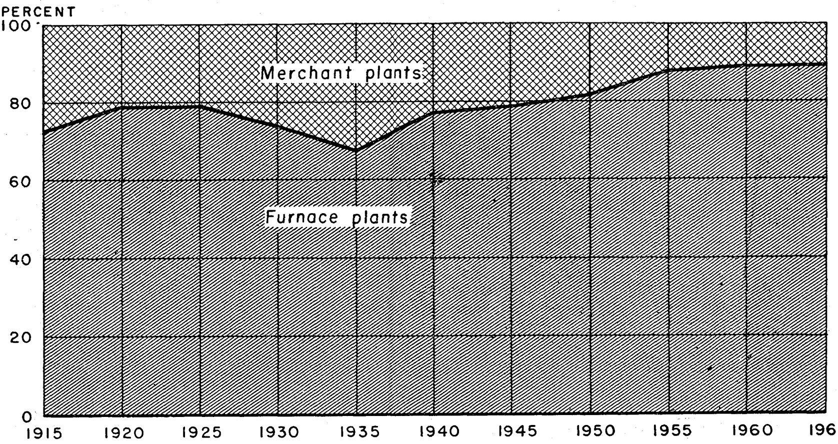

FIGURE 2.—Production of oven coke in the United States, by type of plant.

PRODUCTION BY STATES

The number of States producing coke seldom changes, and for three decades this number ranged between 21 and 24. Coke has always been used mainly as an industrial fuel, and production was centered in the proximity of the coking-coal fields or large coke-consuming areas. At the turn of the century and until World War I, beehive-coke overs were the principal source of metallurgical fuel, and the ovens were built near the coking-coal mines. The coke produced was used largely in nearby blast furnaces, foundries, smelters, and for other industrial purposes. For this reason coke was produced in Georgia, Kansas, Montana, New Mexico, Oklahoma, and Wyoming. The development of slot-type ovens, together with a vast transportation system between the two World Wars, changed markedly the coke production pattern among States. The most significant change was the shift from the coking-coal-producing fields to the huge iron-and steel-producing centers and larger gas-consuming areas. Consequently coke production was discontinued in the above States, and slot-type coke ovens were constructed in and near the steel-producing and consuming cities of Birmingham, Buffalo, Chicago, Cleveland, Detroit, Gary, Pittsburgh, and Youngstown. Thus coke production increased in parts of Alabama, Illinois, Indiana, Michigan, New York, Ohio, and Pennsylvania where these ovens were built. The growing requirements for iron and steel products on the West Coast and in the Southwest before and during World War II caused coke plants to be constructed for the first time in California and Texas, which are both located far from coking-coal deposits. In 1961, 92 percent of the total coke output was produced in 15 States east of the Mississippi River with Pennsylvania, Indiana, and Ohio producing 54 percent of the total. Expansion of coking capacity and slightly higher operating rates of coke ovens in the Chicago area in 1961 enabled Indiana to take over second place in coke production from Ohio for the first time since 1958. Table 8 shows coke production, by States, in 1961 and several preceding years.

TABLE 8.—Production of coke in the United States, by States

(Short tons)

State	1957-59 (average)	1960	1961
Oven coke:			
Alabama	5,024,645	4,897,286	3,949,927
California, Colorado, and Utah	2,701,547	2,840,131	3,017,217
Connecticut, Maryland, New Jersey, and New York	[1] 7,821,854	[1] 7,071,167	6,234,321
Illinois	2,291,276	1,971,107	1,841,273
Indiana	8,148,294	8,024,273	7,666,870
Kentucky, Missouri, Tennessee, and Texas	2,097,415	1,972,816	1,730,069
Michigan	3,166,295	3,278,739	2,958,342
Minnesota and Wisconsin	1,058,305	836,072	713,769
Ohio	8,871,503	8,423,246	6,703,475
Pennsylvania	15,935,874	14,146,269	13,320,866
West Virginia	3,434,892	2,758,002	2,694,280
Total	60,551,900	56,219,108	50,830,409
Beehive coke:			
Pennsylvania	895,358	684,250	453,989
Kentucky, Utah, Virginia, and West Virginia	358,874	[2] 325,360	[3] 426,789
Total	1,254,232	1,009,610	880,778
Grand total	61,806,132	57,228,718	51,711,187

[1] Includes Massachusetts.
[2] Excludes Kentucky and Utah.
[3] Excludes Utah.

COKE BREEZE

The output of 3,390,689 tons of coke screenings or breeze in 1961 valued at $25,324,041 was a decrease of 9 percent in quantity and 8 percent in value from the 1960 figures. Breeze output is governed largely by the quantity of coal carbonized in slot-type coke ovens; few of the active beehive plants recover this material. Yields of breeze per ton of coal carbonized varied only slightly during the past decade and, in 1961, averaged 4.59 percent at oven-coke plants and 4.85 percent for beehive plants that actually recovered it. Details on the production and disposal of coke breeze in 1961 are shown in table 9.

In recent years coke breeze has become an important coke-oven product and demand has risen sharply. Because for many years the uses of breeze were limited, and because its low economic value restricted long distance shipments, approximately 80 percent of the output from oven-coke plants was used at or near the producing plants mainly as boiler fuel. Since the end of World War II, however, uses of breeze have changed. Although the producing companies continue to be the main users of the bulk of breeze production, the major use now is for sintering iron ore. In 1961, producing companies used 78 percent of their output for the following purposes: 57 percent for agglomerating iron ore, 24 percent as boiler fuel, and 19 percent for miscellaneous industrial applications such as lining soaking pits and pig-iron runners. The quantity of breeze consumed in agglomerating plants as shown in table 10 was not the total breeze consumed for this purpose, however, as neither the coke breeze recovered from rescreening blast-furnace coke nor the breeze used at agglomerating plants which are not affiliated with coke plants were included. According to data collected by the Division of Minerals

TABLE 9.—Breeze recovered at coke plants in the United States in 1961, by States

State	Yield per ton of coal [1] (percent)	Produced		Used by producers—						Sold		On hand Dec. 31 (short tons)
				In steam plants		In agglomerating plants		For other industrial uses				
		Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	
Oven coke:												
Alabama	5.84	315,110	$3,208,742	(2)	(2)	84,443	$992,705	25,093	$254,888	174,146	$1,810,768	52,771
California, Colorado, and Utah	6.61	316,117	2,130,682	----------	----------	241,466	1,605,090	21,744	131,914	58,615	432,862	24,541
Counecticut, Maryland, New Jersey, and New York	4.86	433,039	2,836,783	279,316	$1,851,310	(2)	(2)	65,219	405,136	24,714	233,032	119,377
Illinois	4.74	128,138	839,838	(2)	(2)	105,925	583,066	17,227	136,485	19,771	174,028	16,498
Indiana	4.28	464,045	4,989,594	42,463	574,713	473,632	5,344,326	21,237	204,935	(2)	(2)	691,770
Kentucky, Missouri, Tennessee, and Texas	6.27	154,200	1,157,097	----------	----------	(2)	(2)	(2)	(2)	86,373	760,115	15,632
Michigan	4.57	186,896	1,814,447	(2)	(2)	(2)	(2)	(2)	(2)	64,005	565,452	29,449
Minnesota and Wisconsin	5.10	49,256	362,023	(2)	(2)	----------	----------	(2)	(2)	13,669	108,802	64,166
Ohio	4.59	439,094	3,267,513	43,601	305,278	128,237	893,948	61,425	379,912	191,463	1,621,377	108,757
Pennsylvania	3.59	684,399	3,536,867	152,649	888,281	180,237	1,174,151	238,096	727,470	91,264	585,177	292,303
West Virginia	4.23	166,870	962,243	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	1,710
Undistributed	-------	----------	----------	101,429	740,681	304,990	2,173,287	56,705	435,571	38,851	258,479	----------
Total 1961	4.59	3,337,164	25,105,829	619,458	4,360,263	1,518,930	12,766,573	506,746	2,676,311	762,871	6,550,092	[4] 1,416,974
At merchant plants	5.95	456,752	3,956,616	106,216	712,743	----------	----------	12,429	76,289	290,708	2,781,193	130,453
At furnace plants	4.43	2,880,412	21,149,213	513,242	3,647,520	1,518,930	12,766,573	494,317	2,600,022	472,163	3,768,899	1,286,521
Total 1960	4.65	3,705,446	27,436,205	1,142,730	6,941,468	1,343,515	11,155,457	479,740	3,109,697	936,241	7,953,878	[4] 1,472,437
Beehive coke:												
Pennsylvania	3.77	15,656	38,358	----------	----------	----------	----------	----------	----------	17,638	42,263	----------
Kentucky and Virginia	4.99	37,869	179,854	----------	----------	----------	----------	----------	----------	27,289	116,290	10,990
Total 1961	4.85	53,525	218,212	----------	----------	----------	----------	----------	----------	44,927	158,553	10,990
Total 1960	4.82	37,669	87,486	----------	----------	----------	----------	----------	----------	35,999	85,241	2,392

[1] Calculated by dividing production by coal carbonized at plants actually recovering breeze.
[2] Included with "Undistributed" to avoid disclosing individual company figures.
[3] Includes Massachusetts.
[4] Includes some breeze resulting from the screening of coke at blast furnaces.

in the Bureau of Mines on fuels used in all types of agglomerating plants, a total of 2,423,494 tons of coke breeze was used for this purpose in 1961. In addition to coke breeze, substantial quantities of anthracite fines were used to agglomerate iron ore including taconite.

Although the proportion of breeze sold by producing companies in 1961 was approximately the same as it had been for many years, most of the breeze was sold for special uses such as sintering iron ore, smelting phosphate rock, and various other industrial applications. Also the breeze in many cases was shipped great distances. Japan, which did not permit the importation of coke until the middle of 1961, found itself short of coke breeze for sintering iron ore and began importing it. During the latter months of 1961, an estimated 35,000 tons of coke breeze was shipped from the United States to Japan for sintering purposes.

The largest commercial market for the sale of coke breeze is for smelting phosphate rock. The phosphate furnaces in Florida, Tennessee, Idaho, and Montana consumed approximately 645,000 tons of coke breeze in 1961. In some instances, where sufficient breeze could not be obtained for this purpose, larger sizes were purchased and crushed before charging into the furnaces. The increased demand for coke breeze in recent years influenced prices, and the average value per ton of breeze sold in 1961 was $8.30.

TABLE 10.—Oven- and beehive-coke breeze used in the United States and sold, by uses

(Short tons)

Year	Used by producers			Sold	Average value per ton
	In steam plants	In agglomerating plants	For other industrial uses		
1947-49 (average)	3,450,905	[1] 300,000	[2] 489,055	1,142,589	$3.79
1957-59 (average)	1,612,547	796,390	447,171	1,042,308	7.22
1960	1,142,730	1,343,515	479,740	972,240	8.27
1961	619,458	1,518,930	506,746	807,798	8.30

[1] Estimated figure.
[2] Includes 77,795 tons used to make producer or water gas.

NUMBER AND TYPE OF OVENS

Slot-Type Coke Ovens.—The number of serviceable slot-type coke ovens in existence, whether idle or active, decreased for the third consecutive year during 1961. A total of 531 ovens were shut down during the year and either demolished for rebuilding or permanently abandoned; only 435 new ovens were placed in operation. The net loss of 96 ovens reduced the number of serviceable ovens at yearend to the lowest figure since December 31, 1950. Of the 531 ovens retired from service in 1961, 325, or more than half of the total, were reported permanently abandoned. The number of ovens under construction was also the lowest in years although it was known that construction had not started on several additional batteries that were scheduled for rebuilding in 1962 or 1963. A summary of plants, new ovens completed, ovens abandoned, and under construction at the end of the year, by States, is shown in table 11. As is reflected in the statistics shown in table 12, most of the modernization and construction activity during the past two decades has occurred at furnace plants. As indicated, 83 percent of all ovens in existence at furnace plants on December 31, 1961, were less than 25 years old, compared with only 30 percent at merchant plants.

Although there has been a large amount of construction at furnace plants during the past decade, the percentage of ovens under 10 years old in the United States at the end of 1960 was lower than in

TABLE 11.—Slot-type coke ovens completed and abandoned in the United States in 1961, by States

State	Plants in existence Dec. 31[1]	Ovens			
		New	Abandoned during year[2]	In existence Dec. 31	Under construction Dec. 31
Alabama	7	65	----------	[3] 1,516	----------
California	1	----------	----------	315	----------
Colorado	1	----------	----------	206	----------
Connecticut	1	----------	----------	70	----------
Illinois	6	61	----------	568	----------
Indiana	5	87	60	[3] 2,218	----------
Kentucky	1	----------	----------	196	----------
Maryland	1	----------	----------	757	----------
Michigan	4	----------	61	708	----------
Minnesota	3	----------	----------	200	----------
Missouri	1	----------	----------	40	18
New Jersey	1	----------	110	120	----------
New York	3	----------	51	794	110
Ohio	14	45	----------	[3] 2,413	----------
Pennsylvania	12	177	249	[3] 3,720	----------
Tennessee	1	----------	----------	44	----------
Texas	2	----------	----------	140	----------
Utah	2	----------	----------	[3] 308	----------
West Virginia	4	----------	----------	691	51
Wisconsin	1	----------	----------	200	----------
Total 1961	71	435	531	15.224	179
At merchant plants	18	----------	135	1,890	78
At furnace plants	53	435	396	13.334	101
Total 1960	73	[4] 279	952	[4] 15,320	372

[1] Excludes plants retired permanently during year.
[2] Includes ovens dismantled for rebuilding.
[3] Estimated.
[4] Revised figure.

TABLE 12.—Age of slot-type coke ovens in the United States on Dec. 31, 1961[1]

Age	At merchant plants		At furnace plants		Total	
	Number of ovens	Percent of total	Number of ovens	Percent of total	Number of ovens	Percent of total
Under 5 years	----------	----------	1,587	11.9	1,587	10.4
From 5 to 10 years	125	6.6	2,848	21.4	2,973	19.5
From 10 to 15 years	89	4.7	3,046	22.8	3,135	20.6
From 15 to 20 years	120	6.4	2,290	17.2	2,410	15.8
From 20 to 25 years	237	12.5	1,259	9.4	1,496	9.8
From 25 to 30 years	23	1.2	475	3.6	498	3.3
From 30 to 35 years	206	10.9	111	.8	317	2.1
From 35 to 40 years	206	10.9	128	1.0	334	2.2
40 years and over	884	46.8	1,590	11.9	2,474	16.3
Total	1,890	100.0	13,334	100.0	15,224	100.0

[1] Age dates from first entry into operation or from last date of rebuilding.

TABLE 13.—Age of slot-type coke ovens in the United States, West Germany, and the U.S.S.R. in 1960

Age	United States		West Germany [1]		U.S.S.R. [2]	
	Number of ovens	Percent of total	Number of ovens	Percent of total	Number of ovens	Percent of total
From 1 to 10 years	5,316	34.7	3,998	49.8	(3)	56.4
From 10 to 20 years	4,907	32.1	2,023	25.2	(3)	30.6
From 20 to 25 years	1,532	10.0	940	11.7	(3)	6.1
25 years and over	3,565	23.2	1,066	13.3	(3)	6.9
Total	[4] 15,320	100.0	8,027	100.0	(3)	100.0

[1] Steinkohlenbergbauverein, Zahlen und Angaben aus der Kokereiwirtschaft, fur 1960, Essen, 1961.
[2] Coke and Chemistry, U.S.S.R., October 1961.
[3] Not available.
[4] Revised figure.

either the Soviet Union or West Germany. Table 13 compares the age of ovens in the three leading coke-producing countries of the World. The high percentage of ovens in the 1-to-10-year group in West Germany was the result of extensive rebuilding of many batteries in the Ruhr District that were badly damaged during World War II. In the Soviet Union virtually all of the coke plants in the Donets Basin had to be rebuilt after World War II. Also, the rapid expansion of heavy industry, particularly blast-furnace capacity, throughout the Soviet Union in recent years made it necessary to construct coke ovens to produce the metallurgical-fuel requirements. This accounts for the small percentage of ovens over 25 years old. According to an article in the October 1961 issue of Koks i Khimiya (Coke and Chemistry, U.S.S.R.), 28 batteries consisting of 1,751 ovens were constructed in the period from 1956 to 1960. It was also reported that four of these batteries had large-capacity ovens and were designed to produce 788,000 short tons annually. If true, these batteries are larger than any battery in the United States.

The Soviet Union's percentage of ovens in the 1-to-10-year category was larger than that of the United States because of the smaller overall total. The actual number of new ovens constructed in the United States between 1956–60 was larger than in the Soviet Union. Specifically, 34 new batteries consisting of 2,103 ovens were placed in operation in the United States. This was 6 batteries and 352 ovens more than in the Soviet Union.

Oven sizes have been pretty well standardized in the United States, and a composite of all ovens constructed between 1956 and 1961 shows the following dimensions: Length, 40 feet; width, 18 inches; and height, 12 feet. Table 14 shows the ovens, by kind, in the United States on December 31, 1961.

Beehive Ovens.—Table 15 shows the number of beehive-coke ovens, by States, in existence on December 31, 1961. The number of beehive ovens reported to the Bureau of Mines in recent years has fluctuated with the demand for blast-furnace coke and the availability of oven coke. Smaller requirements for blast-furnace coke in the past several years greatly reduced the demand for beehive coke, and the number of serviceable ovens in existence at the end of 1961 was the lowest on record. This was not the total number of beehive

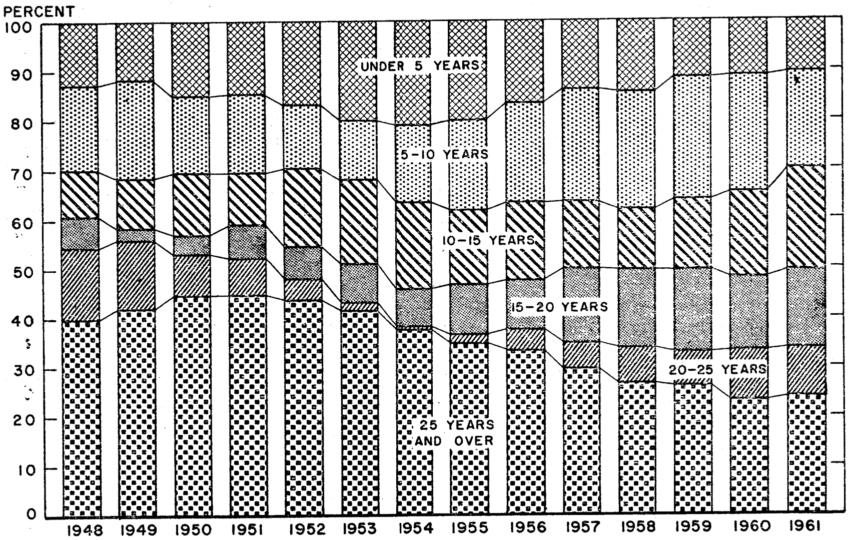

FIGURE 3.—Age of slot-type coke ovens in the United States.

ovens that could be pressed into service if there were a demand for coke and coking coal were available but the number of ovens on which the Bureau of Mines received an annual report from the owners. As noted in table 16, only a small fraction of the operable beehive ovens were active during 1961.

TABLE 14.—Number of slot-type coke ovens in the United States on Dec. 31, 1961, by States and kinds

State	Koppers	Koppers-Becker	Semet-Solvay	Wilputte	All others	Total
Alabama	301	842	180	130	[1] 63	1,516
California	---	315	---	---	---	315
Colorado	60	146	---	---	---	206
Connecticut	---	70	---	---	---	70
Illinois	---	238	---	330	---	568
Indiana	340	1,166	60	652	---	2,218
Kentucky	---	---	120	76	---	196
Maryland	---	757	---	---	---	757
Michigan	---	198	362	148	---	708
Minnesota	65	115	---	20	---	200
Missouri	---	---	---	---	[2] 40	40
New Jersey	55	65	---	---	---	120
New York	184	186	120	304	---	794
Ohio	694	846	176	697	---	2,413
Pennsylvania	778	1,729	88	1,125	---	3,720
Tennessee	---	---	24	20	---	44
Texas	---	140	---	---	---	140
Utah	---	308	---	---	---	308
West Virginia	154	463	---	74	---	691
Wisconsin	100	---	100	---	---	200
Total 1961	2,731	7,584	1,230	3,576	103	15,224
At merchant plants	355	494	624	377	40	1,890
At furnace plants	2,376	7,090	606	3,199	63	13,334
Total 1960	2,854	[3] 7,739	1,290	3,334	103	[3] 15,320

[1] Otto.
[2] Simon-Carves.
[3] Revised figure.

TABLE 15.—Beehive-coke ovens completed and abandoned in the United States in 1961, by States

State	Plants in existence Dec. 31	Ovens		
		New or rebuilt	Abandoned during year	In existence Dec. 31
Kentucky	1			200
Pennsylvania	25	153	1,868	4,493
Virginia	5			663
West Virginia	3		166	346
Total 1961	34	153	[1] 2,034	5,702
Total 1960	43	847	[1] 712	7,583

[1] Idle and not expected to resume production; removed from list of available ovens.

TABLE 16.—Average number of beehive-coke ovens active in the United States in 1961, by months

Month	Number	Month	Number	Month	Number
January	1,824	May	1,778	September	1,743
February	1,886	June	1,754	October	1,794
March	1,753	July	1,740	November	1,771
April	1,710	August	1,757	December	1,683

QUANTITY AND VALUE OF COAL CARBONIZED

The coke industry ranks next to electric-power utilities in using bituminous coal. Unlike electric-power utilities which burn the coal to generate electricity, the coke industry does not actually consume the coal, but merely changes it into special types of fuel and chemical raw materials. The United States coke industry in the past three decades has carbonized annually between 17 and 25 percent of the entire bituminous coal output. In 1961 approximately 18 percent of the national production of bituminous coal was carbonized in coke ovens in the United States. Usually the quantity of bituminous coal carbonized monthly or daily is uniform because coke, the principal product, is used mainly as an industrial fuel and coke-oven operations are not subjected to seasonal variations. This was not the case in 1961 because daily consumption during the first half of the year was much lower than it was during the latter months. As stated in the general summary of this report, the business recession beginning in the latter months of 1960 continued in the first part of 1961, and average daily consumption was lower than normal. Daily coal consumption was lowest in January when only an average of 163,000 tons was carbonized. It increased steadily in the ensuing months, except for a slight dip in July, reaching the highest level of the year in December when daily consumption was 46 percent higher than in January (table 17). Ninety-eight percent of the total quantity of bituminous coal carbonized in 1961 was charged into slot-type ovens. In addition to bituminous coal, 320,125 tons of anthracite was charged into slot-type coke ovens. Virtually all commercial producers of foundry coke used a small percentage of anthracite fines in their coal admixture in 1961.

The total value of bituminous coal and anthracite carbonized in 1961 amounted to $720,983,921, a decrease of 10 percent from 1960. This decrease was due partly to the reduction by 7,183,668 tons in the quantity of coal and also to the $0.10 per ton decrease in average value. This decrease was entirely the result of a drop in the average value of bituminous coal at oven-coke plants, as the average value of anthracite fines increased $0.17 per ton. Tables 19 and 20 show the quantity and value of coal carbonized at oven-coke plants, by States, in 1961 and selected previous years. When compared with the 1957–59 average, coal costs in 1961 were $0.11 per ton lower. A major factor in the decline in coal prices in recent years has been the increased productivity of the bituminous-coal industry through mechanization of the mines. A factor which also influences delivered costs of bituminous coal to oven-coke plants is transportation. Much of the coal carbonized is transported long distances, which adds considerably to the delivered cost or value. The highest coal costs were in States that were farthest from the origin of the coal used, such as California, Illinois, Indiana, Wisconsin, and Minnesota and the eastern States of Connecticut, Maryland, New Jersey, and New York. The cost or value of coal at beehive-coke plants, which are in close proximity to the mines, was only about two-thirds of that for oven-coke plants.

TABLE 17.—Bituminous coal carbonized in coke ovens in the United States, by months

(Short tons)

Month	1957-59 (average)			1960			1961		
	Slot type	Beehive	Total	Slot type	Beehive	Total	Slot type	Beehive	Total
January	7,974,200	220,300	8,194,500	8,706,800	196,700	8,903,500	4,948,800	103,800	5,052,600
February	7,312,300	213,300	7,525,600	8,385,500	212,100	8,597,600	4,683,900	103,400	4,787,300
March	8,125,900	251,200	8,377,100	8,877,700	225,400	9,103,100	5,223,500	117,800	5,341,300
April	7,619,800	230,500	7,850,300	8,011,200	166,300	8,177,500	5,381,600	109,500	5,491,100
May	7,833,800	198,000	8,031,800	7,469,300	130,400	7,599,700	6,070,200	136,300	6,206,500
June	7,569,600	180,700	7,750,300	6,421,000	98,400	6,519,400	6,018,700	133,200	6,151,900
July	6,531,200	138,300	6,669,500	5,630,400	87,400	5,717,800	6,151,400	123,500	6,274,900
August	5,892,900	139,900	6,032,800	5,545,800	126,500	5,672,300	6,359,300	144,000	6,503,300
September	5,849,300	132,400	5,981,700	5,069,600	101,600	5,171,200	6,498,000	126,600	6,624,600
October	6,152,600	127,100	6,279,700	5,484,500	94,100	5,578,600	6,931,000	137,900	7,068,900
November	7,116,800	129,300	7,246,100	4,945.600	102,100	5,047,700	6,859,700	128,600	6,988,300
December	7,842,200	144,300	7,986,500	4,825,900	100,400	4,926,300	7,258,900	131,500	7,390,400
Total	85,820,600	2,105,300	87,925,900	79,373,300	1,641,400	81,014,700	72,385,000	1,496,100	73,881,100

TABLE 18.—Anthracite carbonized at oven-coke plants in the United States, by months

(Short tons)

Month	1957-59 (average)	1960	1961
January	29,700	35,800	25,300
February	28,200	37,700	23,100
March	29,900	42,200	23,600
April	29,100	36,100	25,200
May	30,200	32,900	27,000
June	26,000	29,700	26,100
July	24,800	25,900	25,300
August	25,600	26,200	26,000
September	26,300	25,500	27,300
October	29,800	28,500	28,400
November	29,000	25,700	30,700
December	29,000	24,100	32,100
Total	337,600	370,300	320,100

TABLE 19.—Quantity and value at ovens of coal carbonized in the United States in 1961, by States

State	Coal carbonized			Coal per ton of coke	
	Short tons	Value		Short tons	Value
		Total	Average		
Oven coke:					
Alabama	5,395,530	$45,102,580	$8.36	1.37	$11.42
California, Colorado, and Utah	4,781,978	61,794,520	12.92	1.58	20.48
Connecticut, Maryland, New Jersey, and New York	8,901,673	106,894,276	12.01	1.43	17.15
Illinois	2,703,113	26,596,008	9.84	1.47	14.44
Indiana	10,843,269	121,475,190	11.20	1.41	15.84
Kentucky, Missouri, Tennessee, and Texas	2,457,783	21,181,476	8.62	1.42	12.24
Michigan	4,088,718	41,446,237	10.14	1.38	14.01
Minnesota and Wisconsin	966,385	10,698,415	11.07	1.35	14.99
Ohio	9,574,548	87,252,136	9.11	1.43	13.02
Pennsylvania	19,045,296	158,623,252	8.33	1.43	11.91
West Virginia	3,946,872	30,796,777	7.80	1.46	11.43
Total 1961	72,705,165	711,860,867	9.79	1.43	14.00
At merchant plants	7,682,794	75,670,993	9.85	1.40	13.78
At furnace plants	65,022,371	636,189,874	9.78	1.43	14.03
Total 1960	79,743,529	788,798,803	9.89	1.42	14.03
Beehive coke:					
Pennsylvania	735,483	4,507,487	6.13	1.62	9.93
Kentucky, Virginia, and West Virginia	760,623	4,615,567	6.07	1.78	10.81
Total 1961	1,496,106	9,123,054	6.10	1.70	10.36
Total 1960	1,641,410	10,025,391	6.11	1.63	9.93

TABLE 20.—Average value per short ton of coal carbonized at oven-coke plants in the United States, by States

State	1957–59 (average)	1960	1961
Alabama	$8.13	$8.18	$8.36
California, Colorado, and Utah	12.24	12.56	12.92
Connecticut, Maryland, Massachusetts, New Jersey, and New York	11.87	11.94	[1] 12.01
Illinois	10.65	10.17	9.84
Indiana	11.23	11.43	11.20
Kentucky, Missouri, Tennessee, and Texas	10.60	9.93	8.62
Michigan	10.22	10.08	10.14
Minnesota and Wisconsin	11.46	11.32	11.07
Ohio	9.79	9.61	9.11
Pennsylvania	8.56	8.45	8.33
West Virginia	7.74	7.75	7.80
U.S. average	9.90	9.89	9.79
Value of coal per ton of coke	14.08	14.03	14.00

[1] Excludes Massachusetts.

TABLE 21.—Value of coal and products per short ton of coal carbonized in the United States

Year	Oven coke					Beehive coke	
	Value of coal per ton	Value per ton of coal				Value of coal per ton	Value per ton of coal
		Coke produced	Breeze produced	Coal-chemical materials used or sold [1]	Total		
1957–59 (average)	$9.90	$12.75	$0.31	$3.84	$16.90	$6.12	$8.76
1960	9.89	12.96	.34	3.85	17.15	6.11	8.99
1961	9.79	12.45	.34	3.84	16.63	6.10	8.88

[1] Includes value of surplus gas used and tar and pitch-of-tar burned.

PREPARATION AND SOURCE OF COAL

Washed and Unwashed Coals.—Most oven-coke plants use coals that have been mechanically cleaned, and in 1961, 85 percent of the total quantity carbonized was washed before carbonization. Coke-oven operators have used cleaned coal since before the turn of the century, but it was not until 1951 that the proportion of cleaned coal carbonized exceeded raw coal. During the first half of the century, only the best or premium quality coals were mined. Also, hand loading permitted the selection of high-grade coal and made cleaning unnecessary for many of the coking coals. Until the close of World War II, less than one-fourth of the coal carbonized in the United States was mechanically cleaned. In the 10-year period, 1948–57, the quantity of washed coals charged into coke ovens nearly tripled, rising from 29 percent of the total carbonized to 73 percent. Since 1957, the tonnage of cleaned coal charged into the ovens has declined because of reduced coke production, but the proportion of washed coal carbonized has actually increased as indicated in table 23. Most of the coal is cleaned at the mines and only one coke plant had a washery adjacent to the ovens. All coal carbonized in Colorado, Connecticut, Kentucky, Michigan, Missouri, New Jersey, West Virginia, and Wisconsin was washed. Over 99 percent of the coal charged into ovens in Alabama and Minnesota was washed, 90 percent in Illinois, Indiana, New York, and Ohio, and more than 70 percent in California, Pennsylvania, Tennessee, Texas, Utah, and Virginia.

TABLE 22.—Washed and unwashed coal carbonized in the United States in 1961, by States in which used

(Short tons)

State	Bituminous coal			Anthracite	Grand total
	Washed	Unwashed	Total		
Oven coke:					
Alabama	5,346,152	22,975	5,369,127	26,403	5,395,530
California, Colorado, and Utah	3,815,003	966,975	4,781,978	----------	4,781,978
Connecticut, Maryland, New Jersey, and New York	4,532,553	4,338,464	8,871,017	30,656	8,901,673
Illinois	2,417,385	276,367	2,693,752	9,361	2,703,113
Indiana	10,275,968	527,150	10,803,118	40,151	10,843,269
Kentucky, Missouri, Tennessee, and Texas	2,251,557	185,190	2,436,747	21,036	2,457,783
Michigan	4,023,808	----------	4,023,808	64,910	4,088,718
Minnesota and Wisconsin	910,300	2,946	913,246	53,139	966,385
Ohio	8,450,258	1,081,247	9,531,505	43,043	9,574,548
Pennsylvania	15,730,168	3,283,702	19,013,870	31,426	19,045,296
West Virginia	3,946,872	----------	3,946,872	----------	3,946,872
Total 1961	61,700,024	10,685,016	72,385,040	320,125	72,705,165
At merchant plants	7,142,025	268,156	7,410,181	272,613	7,682,794
At furnace plants	54,557,999	10,416,860	64,974,859	47,512	65,022,371
Total 1960	66,709,730	12,663,537	79,373,267	370,262	79,743,529
Beehive coke:					
Pennsylvania	587,658	147,825	735,483	----------	735,483
Kentucky, Virginia, and West Virginia	596,574	164,049	760,623	----------	760,623
Total 1961	1,184,232	311,874	1,496,106	----------	1,496,106
Total 1960	1,208,781	432,629	1,641,410	----------	1,641,410

TABLE 23.—Washed and unwashed bituminous coal carbonized in the United States

(Short tons)

Year	Washed coal			Unwashed coal			Total coal carbonized	Percent of total washed
	At coke ovens	At beehive ovens	Total	At coke ovens	At beehive ovens	Total		
1957-59 (average)	66,219,149	1,429,859	67,649,008	19,601,434	675,484	20,276,918	87,925,926	76.9
1960	66,709,730	1,208,781	67,918,511	12,663,537	432,629	13,096,166	81,014,677	83.8
1961	61,700,024	1,184,232	62,884,256	10,685,016	311,874	10,996,890	73,881,146	85.1

Blending.—Mixing or blending coals before charging into ovens is standard practice at oven-coke plants in the United States. The principal objective in mixing or blending coking coals is to obtain and maintain uniformity in the chemical and physical properties of the coke produced. Because virtually every coke plant obtains coal from more than one mine and from different fields, and because the quality of coal varies from field to field and even from mine to mine in the same field, mixing or blending is necessary. Mixing also enables the coke-producing companies to use varying proportions of inferior coal that could not be used alone. Thus, in addition to permitting coke-plant operators to control the quality of coke, blending also broadens the range of coals that can be used. Usually two types of coal (high-volatile and low-volatile) are mixed or blended, although a few plants use a third coal (medium-volatile) or other blending material such as anthracite, coke breeze, and coal-tar pitch. Virtually all foundry-coke producers used a small percentage of anthracite fines in their

TABLE 24.—Coal received by coke-oven operators in the United States in 1961, by consuming States and volatile content [1]

(Short tons)

Consuming state	High-volatile		Medium-volatile		Low-volatile		Total coal receipts
	Quantity	Percent of total	Quantity	Percent of total	Quantity	Percent of total	
Alabama	428,377	7.2	5,162,409	86.9	350,432	5.9	5,941,218
California, Colorado, and Utah	4,122,374	78.8	660,417	12.6	[2] 451,059	8.6	5,233,850
Connecticut, Maryland, New Jersey, and New York	6,329,394	68.8	404,241	4.4	2,469,302	26.8	9,202,937
Illinois	1,994,937	74.6	34,415	1.3	643,998	24.1	2,673,350
Indiana	6,236,467	54.2	1,707,335	14.8	3,574,087	31.0	11,517,889
Kentucky, Missouri, Tennessee, and Texas	1,728,823	71.7	233,729	9.7	449,193	18.6	2,411,745
Michigan	2,612,714	63.9	404,496	9.9	1,070,569	26.2	4,087,779
Minnesota and Wisconsin	527,958	54.5	66,447	6.9	374,129	38.6	968,534
Ohio	7,008,870	75.1	156,881	1.7	2,169,321	23.2	9,335,072
Pennsylvania	13,691,308	72.6	1,856,208	9.9	3,303,277	17.5	18,850,793
West Virginia	3,426,503	84.6	----------	--------	625,935	15.4	4,052,438
Total 1961	48,107,725	64.8	10,686,578	14.4	15,481,302	20.8	74,275,605
At merchant plants	4,183,883	54.2	1,014,685	13.1	2,529,039	32.7	7,727,607
At furnace plants	43,923,842	66.0	9,671,893	14.5	12,952,263	19.5	66,547,998
Total 1960	52,539,894	65.6	11,393,882	14.2	16,146,391	20.2	80,080,167

---

[1] Volatile matter on moisture- and ash-free basis: High-volatile—over 31 percent; medium-volatile—22 to 31 percent; and low-volatile—14 to 22 percent.

[2] Includes small tonnage from Canada.

coal blends. Coal-tar pitch was used to improve coke quality at several plants where low-rank coking coals were used.

As previously mentioned, most of the plants mixed high- and low-volatile coals in 1961 as 38 (including 8 using anthracite) used high- and low-volatile coals; 20 (including 10 using anthracite) used high-, medium-, and low-volatile; 4 used high- and medium-volatile coal; and 3 used low- and medium-volatile. Five plants used straight medium-volatile coal.

TABLE 25.—Average volatile content of bituminous coal carbonized at oven-coke plants in the United States

Year	High		Medium		Low		Total	
	Short tons	Volatile content (percent)	Short tons	Volatile content (percent)	Short tons	Volatile content (percent)	Short tons	Volatile content (percent)
1957-59 (average)	56,499,763	34.9	11,447,103	26.0	17,873,717	17.7	85,820,583	30.1
1960	52,065,009	35.5	11,113,548	25.8	16,194,710	17.5	79,373,267	30.4
1961	47,304,877	35.6	10,175,333	25.9	14,904,830	17.6	72,385,040	30.5

TABLE 26.—Origin of coal received by coke-oven operators in the United States in 1961, by producing fields and volatile content

(Short tons)

State and field [1] where coal was produced	Volatile content [2]			Total
	High	Medium	Low	
Alabama	536,386	4,928,884	----	5,465,270
Arkansas	----	----	92,415	92,415
Colorado	1,127,513	574,681	----	1,702,194
Illinois	724,759	----	----	724,759
Kentucky:				
Elkhorn	5,370,364	----	----	5,370,364
Harlan	3,911,654	----	----	3,911,654
Kenova-Thacker	2,160	----	----	2,160
New Mexico	350,018	----	----	350,018
Oklahoma	347,995	267,207	[3] 81,474	696,676
Pennsylvania:				
Anthracite	----	----	326,742	326,742
Bituminous:				
Central Pennsylvania	----	237,346	2,106,045	2,343,391
Connellsville	5,255,769	----	----	5,255,769
Freeport	2,781,550	----	----	2,781,550
Pittsburgh	9,595,974	----	----	9,595,974
Somerset	----	----	272,896	272,896
Westmoreland	277,240	----	----	277,240
Tennessee	----	220,326	----	220,326
Utah	2,633,011	----	----	2,633,011
Virginia:				
Buchanan	155,095	859,257	----	1,014,352
Clinch Valley	----	245,220	----	245,220
Pocahontas	----	115,280	236,451	351,731
Southwestern	1,134,058	529,870	----	1,663,928
West Virginia:				
Coal River	293,451	----	----	293,451
Fairmont	4,758,067	----	----	4,758,067
Kanawha	4,685,951	----	----	4,685,951
Kenova-Thacker	1,125,138	----	----	1,125,138
Logan	2,339,961	37,804	----	2,377,765
New River	4,139	----	382,198	386,337
Pocahontas	----	917,855	9,392,218	10,310,073
Randolph-Barbour	140,318	----	----	140,318
Tug River	----	----	44,482	44,482
Webster-Gauley	557,154	945,983	----	1,503,137
Winding Gulf	----	806,865	2,546,381	3,353,246
Total	48,107,725	10,686,578	15,481,302	74,275,605

[1] As defined by the U.S. Coal Commission of 1922.

[2] Volatile matter on moisture- and ash-free basis: High-volatile—over 31 percent; medium-volatile—22 to 31 percent; and low-volatile—14 to 22 percent.

[3] Includes small tonnage from Canada.

Sources.—Sources of coking coal are important because of their limited distribution. The United States is fortunate that the reserves of coking coal in the Appalachian region (Alabama, Kentucky, Tennessee, Virginia, West Virginia, and Pennsylvania) are vast and compare favorably in quality with any other coal throughout the world. This region supplies approximately 95 percent of the coal carbonized in the United States, two-thirds of the total carbonized in Canada, and increasing quantities are shipped to Europe, South America, and Asia. High-, medium-, and low-volatile coals are mined in this region. Low-volatile coals are important to the coke industry because they improve the physical properties of metallurgical coke, particularly its strength. Of significance have been the shipments during the past several years of low-volatile coal from the

TABLE 27.—Origin and destination of coal delivered to oven-coke plants in the United States in 1961, by States

(Short tons)

Consuming state	Coal produced in—						
	Alabama	Arkansas	Colorado	Illinois	Kentucky	New Mexico	Oklahoma
Alabama	5,357,261	-----	-----	-----	-----	-----	-----
California, Colorado, and Utah	-----	92,415	1,702,194	-----	-----	350,018	[1] 145,949
Connecticut, Maryland, New Jersey, and New York	-----	-----	-----	-----	1,123,622	-----	-----
Illinois	-----	-----	-----	568,513	1,206,334	-----	-----
Indiana	-----	-----	-----	156,246	4,885,653	-----	-----
Kentucky, Missouri, Tennessee, and Texas	108,009	-----	-----	-----	-----	-----	550,727
Michigan	-----	-----	-----	-----	921,280	-----	-----
Minnesota and Wisconsin	-----	-----	-----	-----	114,009	-----	-----
Ohio	-----	-----	-----	-----	521,495	-----	-----
Pennsylvania	-----	-----	-----	-----	511,785	-----	-----
West Virginia	-----	-----	-----	-----	-----	-----	-----
Total 1961	5,465,270	92,415	1,702,194	724,759	9,284,178	350,018	696,676
At merchant plants	548,902	-----	-----	-----	84,858	-----	-----
At furnace plants	4,916,368	92,415	1,702,194	724,759	9,199,320	350,018	696,676
Total 1960	6,285,108	127,303	1,500,536	637,350	10,200,993	190,871	[1] 961,251

Consuming state	Coal produced in—					
	Pennsylvania	Tennessee	Utah	Virginia	West Virginia	Total
Alabama	26,184	194,508	-----	49	363,216	5,941,218
California, Colorado, and Utah	-----	-----	2,633,011	21,370	288,893	5,233,850
Connecticut, Maryland, New Jersey, and New York	2,795,835	-----	-----	444,104	4,839,376	9,202,937
Illinois	9,344	-----	-----	34,418	854,741	2,673,350
Indiana	48,402	-----	-----	892,150	5,535,438	11,517,889
Kentucky, Missouri, Tennessee, and Texas	14,563	25,818	-----	155,684	1,556,944	2,411,745
Michigan	334,690	-----	-----	304,971	2,526,838	4,087,779
Minnesota and Wisconsin	55,541	-----	-----	-----	798,984	968,534
Ohio	3,543,779	-----	-----	631,931	4,637,867	9,335,072
Pennsylvania	10,828,009	-----	-----	790,554	6,720,445	18,850,793
West Virginia	3,197,215	-----	-----	-----	855,223	4,052,438
Total 1961	20,853,562	220,326	2,633,011	3,275,231	28,977,965	74,275,605
At merchant plants	275,699	-----	-----	403,282	6,414,866	7,727,607
At furnace plants	20,577,863	220,326	2,633,011	2,871,949	22,563,099	66,547,998
Total 1960	22,834,884	203,351	2,340,289	3,525,695	31,272,536	80,080,167

[1] Includes small tonnage from Canada.

Appalachian region to the far western coke plants in Colorado, Utah, and California. As shown in table 27, nearly 300,000 tons of low-volatile coal from West Virginia was shipped to these States in 1961. Every State where slot-type ovens were operated in 1961 received varying quantities of coal from West Virginia. Although West Virginia was the leading supplier of coking coal, it supplied only 21 percent of the coal carbonized within the State. This was due to the proximity of the two large coke plants in this State to the coal fields of western Pennsylvania, which supply the bulk of the coking coal used in West Virginia.

Captive Coal.—Usually about two-thirds of the coal carbonized in slot-type ovens is obtained from mines owned and operated by the coke-producing companies and the remainder is purchased from commercial mines. The mines owned and operated by the coke-producing companies are known as captive mines, which seldom produce coal for the commercial market and operate primarily to meet their own coal requirements. This is known as captive coal. The coke industry uses more captive coal than any other major coal-consuming industry. Probably the most important factor for the integration of coal mining and coke manufacture is that by owning their own coal mines, coke producers can maintain better control of quality and can assure an adequate supply during periods of heavy demand for coal. As shown in table 28, furnace oven-coke plants use a higher proportion of captive coal than nonfurnace or merchant plants.

TABLE 28.—**Quantity and percentage of captive coal received by coke-oven operators in the United States**

(Short tons)

Year	At merchant plants			At furnace plants			Total		
	Total coal received	Captive coal		Total coal received	Captive coal		Total coal received	Captive coal	
		Quantity	Percent		Quantity	Percent		Quantity	Percent
1957–59 (average)	10,270,085	4,523,385	44.0	76,660,207	48,941,264	63.8	86,930,292	53,464,649	61.5
1960	8,726,368	3,834,264	43.9	71,353,799	45,091,010	63.2	80,080,167	48,925,274	61.1
1961	7,727,607	3,214,284	41.6	66,547,998	42,354,003	63.6	74,275,605	45,568,287	61.4

CONSUMPTION OF COKE

Table 29 shows the apparent consumption of coke in the United States in 1961 and selected preceding years. The apparent consumption of coke is based on production, imports, exports, and changes in producers' stocks. In 1961 the apparent consumption of coke was 9 percent below the 1960 figure and 25 percent below the high level attained following World War II (1947–49). The loss of coke markets, particularly in the residential-heating and gas-manufacturing fields to fuel oil and natural gas, were major contributing factors in this decline. Until 1950, coke markets were much more diversified than in subsequent years. For example, in the 1937–39 period, more than one-third of all coke consumed in the United States was used for purposes other than as blast-furnace fuel, with approximately 18 percent used for commercial and residential space heating and cooking. During and following the end of World War II, the loss of the domestic coke market was more than offset by the rapidly increasing requirements of coke for smelting iron ore. Coke consumption in iron blast furnaces in the 10 years between 1937–39 and 1947–49 almost doubled in volume and rose from 66 to 80 percent of the total consumption. In the next decade or between 1947–49 and 1957–59, the proportion of coke consumed by iron blast furnaces increased to nearly 90 percent of the total national consumption. However, during the 1950's the most significant development in coke utilization was the steady decline of coke rates in blast furnaces. Between 1947–49 and 1957–59, the quantity of coke required to make one ton of pig iron and ferroalloys in blast furnaces decreased 285.3 pounds or 15 percent. This decline continued through 1961 when the coke rate dropped to 1,432.6 pounds per ton of pig iron and ferroalloys, the lowest figure on record. The trend in coke rates during the past two decades is shown graphically in figure 4. This gradual decline in coke rates was due to a number of factors such as improvements in the chemical and physical properties of coke, in iron-ore beneficiation procedures, and in blast-furnace operating techniques. An operating technique used by a number of companies in 1961 that showed promise of further lowering coke rates in the future was supplemental fuel injection (gaseous, liquid, or solid fuel) in the smelting zone of a blast furnace.

TABLE 29.—Apparent consumption of coke in the United States

(Short tons)

Year	Total production	Imports	Exports	Net change in stocks	Apparent U.S. consumption [1]	Consumption			
						In iron furnaces [2]		All other purposes	
						Quantity	Percent	Quantity	Percent
1937-39 (average)	43,065,975	187,838	534,393	+290,011	42,429,409	28,009,630	66.0	14,419,779	34.0
1947-49 (average)	70,648,402	181,000	696,699	+280,230	69,852,473	55,877,463	80.0	13,975,010	20.0
1957-59 (average)	61,806,132	120,908	558,428	+782,665	60,585,947	54,140,391	89.4	6,445,556	10.6
1960	57,228,718	[3] 126,345	353.016	+55,652	[3] 56,946,395	51,044,206	89.6	[3] 5,902,189	10.4
1961	51,711,187	126,518	445,232	−696,215	52,088,688	46,771,105	89.8	5,317,583	10.2

[1] Production plus imports minus exports, plus or minus net change in stocks.
[2] American Iron and Steel Institute; figures include coke consumed in manufacturing ferroalloys.
[3] Revised figure.

Tables 31 and 32 summarize, by major end uses, the disposal of oven and beehive coke in 1961. A larger proportion of the oven coke, particularly at furnace plants, was used by producers in integrated blast furnaces, whereas nearly all of the beehive coke was shipped outside the producing works. For example, furnace plants used approximately 95 percent of their output for smelting iron ore in blast furnaces and sold the remainder for miscellaneous industrial purposes. Merchant plants used only a small proportion or less than 8 percent of their output and supplied most of the coke used in iron foundries, nonferrous smelters, and chemical-process plants. Approximately 40 percent of the coke produced by merchant coke-plant operators in 1961 was shipped to iron blast furnaces, 34 percent to iron foundries, 15 percent to other industrial plants, and 6 percent for residential and commercial space heating and cooking. Historically, beehive coke was used mainly as a blast-furnace fuel for smelting iron ore. In the past several years, however, the proportion of beehive coke shipped to other industrial plants, mainly chemical-process plants, exceeded shipments to blast furnaces. For example in 1951, 87 percent of the beehive coke produced was shipped to iron blast furnaces, but by 1961, the beehive coke shipped to iron blast furnaces had decreased to 40 percent.

TABLE 30.—Coke and coking coal consumed per short ton of pig iron and ferroalloys produced in the United States

Year	Coke per short ton of pig iron and ferroalloys [1] (pounds)	Yield of coke from coal (percent)	Coking coal per short ton of pig iron and ferroalloys (pounds calculated)	Year	Coke per short ton of pig iron and ferroalloys [1] (pounds)	Yield of coke from coal (percent)	Coking coal per short ton of pig iron and ferroalloys (pounds calculated)
1913	2,172.6	66.9	3,247.5	1949	1,895.8	69.6	2,723.9
1918	2,120.7	66.4	3,193.8	1957–59 (average)	1,634.4	70.0	2,334.9
1929	1,838.0	69.0	2,663.8	1960	1,516.4	70.3	2,157.0
1939	1,778.0	69.8	2,547.3	1961	1,432.6	69.7	2,055.4

[1] American Iron and Steel Institute; consumption per ton of pig iron only, excluding furnaces making ferroalloys, was 2,172.6 in 1913, 2,120.7 in 1918, 1,813.3 in 1929, 1,760.0 in 1939, 1,870.4 in 1949, 1,617.0 in 1957–59 (average), 1,497.4 in 1960, and 1,415.0 in 1961.

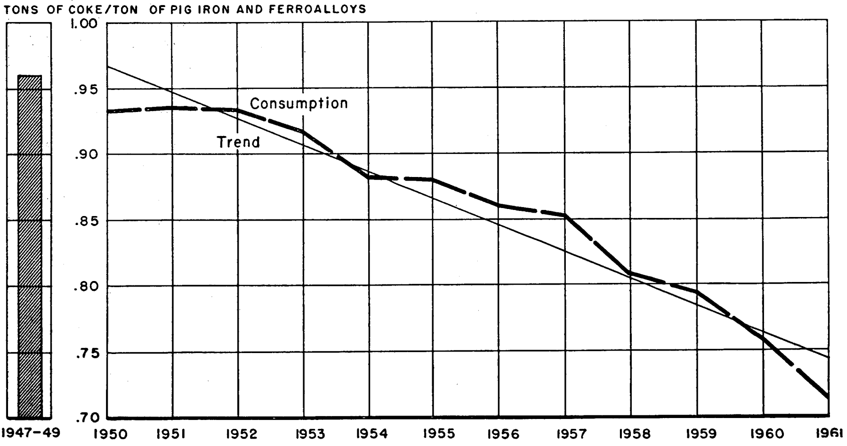

FIGURE 4.—Coke consumption per ton of pig iron and ferroalloys produced in blast furnaces.

TABLE 31.—Oven coke produced in the United States, used by producers, and sold in 1961, by States

State	Produced		Used by producing companies—				Commercial sales	
			In blast furnaces		For other purposes [1]		To blast-furnace plants	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Alabama	3,949,927	$83,339,880	3,296,026	$66,303,848	93,896	$2,581,740	(2)	(2)
California, Colorado, and Utah	3,017,217	73,864,736	3,007,043	73,626,415	8,861	189,624		
Connecticut, Maryland, New Jersey, and New York	6,234,321	104,722,267	5,215,530	83,826,452	93,216	1,484,371	393,633	$6,995,263
Illinois	1,841,273	35,416,194	1,806,854	33,585,123	85,314	2,692,122		
Indiana	7,666,870	132,999,987	6,782,988	114,456,350	8,092	125,550	(2)	(2)
Kentucky, Missouri, Tennessee, and Texas	1,730,069	31,491,057	666,710	13,160,039	24,543	608,050	(2)	(2)
Michigan	2,958,342	51,460,209	(2)	(2)	215,695	4,731,321	74,144	1,277,013
Minnesota and Wisconsin	713,769	17,157,543	(2)	(2)	(2)	(2)		
Ohio	6,703,475	112,869,832	5,921,484	96,902,508	142,189	2,857,536	(2)	(2)
Pennsylvania	13,320,866	215,005,692	12,961,040	207,676,140	33,751	559,635	312,669	5,190,738
West Virginia	2,694,280	46,605,776	2,711,791	46,955,674	(2)	(2)	(2)	(2)
Undistributed			2,526,067	39,036,718	1,193	20,793	1,562,319	23,979,703
Total 1961	50,830,409	904,933,173	44,895,533	775,529,267	706,750	15,850,742	2,342,765	37,442,717
At merchant plants	5,490,047	118,950,630			414,498	8,661,878	2,119,206	33,846,026
At furnace plants	45,340,362	785,982,543	44,895,533	775,529,267	292,252	7,188,864	223,559	3,596,691
Total 1960	56,219,108	1,033,167,857	47,729,475	859,870,647	872,948	18,416,068	3,485,549	55,151,975

State	Commercial sales—Continued							
	To foundries		To other industrial plants [3]		For residential heating		Total	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Alabama	424,101	$12,274,154	(2)	(2)	23,378	$312,078	730,968	$17,119,952
California, Colorado, and Utah	(2)	(2)	(2)	(2)	(2)	(2)	25,339	638,182
Connecticut, Maryland, New Jersey, and New York	226,113	6,604,058	238,670	$3,950,917	215,906	3,900,700	1,074,322	21,450,938
Illinois	------	------	19,599	285,116	3,103	47,829	22,702	332,945
Indiana	(2)	(2)	104,497	2,004,660	24,859	375,382	431,293	11,218,770
Kentucky, Missouri, Tennessee, and Texas	(2)	(2)	72,057	1,250,119	(2)	(2)	1,112,414	19,435,940
Michigan	(2)	(2)	209,737	3,506,850	(2)	(2)	565,498	13,478,135
Minnesota and Wisconsin	(2)	(2)	85,101	1,789,033	(2)	(2)	434,799	12,336,881
Ohio	239,495	7,173,113	149,567	2,212,846	(2)	(2)	905,612	17,331,384
Pennsylvania	151,088	4,576,392	117,975	1,629,041	23,855	374,555	605,587	11,770,726
West Virginia	------	------	18,905	212,861	(2)	(2)	22,411	259,406
Undistributed	1,046,000	32,124,549	160,396	2,773,934	33,778	552,355	------	------
Total 1961	2,086,797	62,752,266	1,176,504	19,615,377	324,879	5,562,899	5,930,945	125,373,259
At merchant plants	1,871,207	56,306,463	838,763	15,028,081	317,133	5,443,058	5,146,309	110,623,628
At furnace plants	215,590	6,445,803	337,741	4,587,296	7,746	119,841	784,636	14,749,631
Total 1960	2,222,542	67,326,685	1,424,650	23,180,927	396,927	6,845,119	7,529,668	152,504,706

---

[1] Comprises 226,422 tons valued at $7,162,430 used in foundries; 69,932 tons, $1,179,018 to make producer and water gas; and 410,396 tons, $7,509, 294 for other purposes.

[2] Included with "Undistributed" to avoid disclosing individual company figures.

[3] Includes 34,739 tons valued at $638,075 to water-gas plants.

TABLE 32.—Beehive coke produced in the United States, used by producers, and sold in 1961, by States

State	Produced		Used by producing companies—				Commercial sales	
			In blast furnaces		For other purposes		To blast-furnace plants	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Pennsylvania	453,989	$6,248,436	(1)	(1)	(2)	(2)	266,664	$4,005,333
Kentucky, Virginia, and West Virginia	426,789	7,036,887					83,142	1,343,911
Total 1961	880,778	13,285,323	(1)	(1)	(2)	(2)	349,806	5,349,244
Total 1960	1,009,610	14,752,563	31,395	(3)			591,453	8,886,408

State	Commercial sales—Continued							
	To foundries		To other industrial plants		For residential heating		Total	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Pennsylvania	(1)	(1)	185,027	$2,212,017	(2)	(2)	451,691	$6,217,350
Kentucky, Virginia, and West Virginia	(1)	(1)	341,971	5,664,131	(2)	(2)	425,113	7,008,042
Total 1961	(1)	(1)	526,998	7,876,148	(2)	(2)	876,804	13,225,392
Total 1960	6,892	$108,613	384,570	5,303,061	451	$6,488	983,366	14,304,570

[1] Combined with "sold to blast-furnace plants" to avoid disclosing individual company figures.
[2] Combined with "sold to other industrial plants" to avoid disclosing individual company figures.
[3] Concealed to avoid disclosing individual company figures.

DISTRIBUTION OF OVEN AND BEEHIVE COKE

Table 33 shows the distribution of coke and breeze in 1961 according to final destinations and major end uses. In the following discussion, the terms distribution and consumption are used synonymously. Coke is a special purpose fuel used in various industrial applications, particularly by heavy industry. Since 1951 approximately 90 percent of the total distribution of coke, excluding breeze, in the United States was used to smelt iron ore in 17 States. In 1961, blast furnaces consumed 91 percent of the total coke disposal with Pennsylvania, Ohio, and Indiana using more than one-half of the total. These States plus Illinois, Alabama, and Michigan used three-fourths of the total blast-furnace coke. Usually blast-furnace coke is not transported long distances because most of the iron- and steel-producing companies have integrated their coke ovens, blast furnaces, and steel-making furnaces to eliminate transportation charges of the two principal raw materials, coke and pig iron. As a result, some of the major steel-producing centers of the United States (Chicago, Buffalo, Detroit, Cleveland, and the Ohio Valley) were developed by bringing the coking coal and iron ore together rather than transporting coke and pig iron. Roughly 90 percent of the coke used in blast furnaces in 1961 was produced within the consuming State.

Unlike blast-furnace coke, shipments of coke to foundries and other industrial plants, in many cases, cover great distances. All States

TABLE 33.—Distribution of oven and beehive coke and breeze in 1961 [1]

(Short tons)

Consuming State	Coke						Breeze
	To blast-furnace plants	To foundries	To producer- and water-gas plants	To other industrial plants	For residential heating	Total	
Alabama	3,302,207	167,190	----------	65,088	10,553	3,545,038	227,105
Arizona	----------	1,703	----------	24	----------	1,727	45
Arkansas	----------	1,383	----------	952	----------	2,335	28
California	1,294,670	51,855	----------	36,193	----------	1,382,718	139,927
Colorado	559,781	13,893	----------	20,455	1	594,130	71,083
Connecticut	----------	23,725	56,627	1,359	24,123	105,834	36,631
Delaware	----------	56	----------	2,503	33	2,592	2,645
District of Columbia	----------	30	----------	----------	----------	30	102
Florida	----------	4,512	----------	26,761	271	31,544	37,478
Georgia	----------	11,603	----------	2,103	3,768	17,474	662
Idaho	----------	83	----------	98,633	----------	98,716	8,505
Illinois	3,512,594	231,232	----------	61,168	11,035	3,816,029	160,195
Indiana	5,812,309	120,004	1,011	59,676	18,167	6,011,167	542,256
Iowa	----------	52,414	----------	410	718	53,542	868
Kansas	----------	9,428	----------	97	----------	9,525	38
Kentucky	541,748	39,008	----------	156,448	11,412	748,616	45,680
Louisiana	----------	2,178	----------	54,973	148	57,299	11,881
Maine	----------	1,023	19,706	----------	2,013	22,742	----------
Maryland	2,904,144	19,026	----------	8,960	----------	2,932,130	152,889
Massachusetts	----------	39,074	----------	2,182	75,698	116,954	38
Michigan	3,014,007	461,635	----------	223,883	3,446	3,702,971	199,959
Minnesota	271,895	19,505	----------	19,991	3,756	315,147	11,467
Mississippi	----------	897	----------	29	----------	926	79
Missouri	----------	25,559	----------	53,490	53	79,102	1,250
Montana	----------	1,816	----------	19,261	343	21,420	28,959
Nebraska	----------	3,657	----------	6,348	----------	10,005	7,471
Nevada	----------	----------	----------	5,705	----------	5,705	----------
New Hampshire	----------	2,461	----------	----------	3,048	5,509	----------
New Jersey	----------	98,854	13,919	84,283	81,292	278,348	50,491
New Mexico	----------	217	----------	178	425	820	163
New York	2,808,961	70,613	----------	73,623	25,729	2,978,926	160,979
North Carolina	----------	18,768	----------	20,397	1,541	40,706	22,558
North Dakota	----------	242	----------	171	----------	413	----------
Ohio	7,967,606	274,557	----------	207,671	5,244	8,455,078	297,928
Oklahoma	----------	4,045	----------	66	----------	4,111	12,270
Oregon	----------	5,348	----------	18,471	----------	23,819	574
Pennsylvania	12,107,335	129,007	13,408	289,698	23,054	12,562,502	693,380
Rhode Island	----------	8,951	----------	219	2,682	11,852	----------
South Carolina	----------	7,675	----------	21,981	484	30,140	5,163
South Dakota	----------	2,539	----------	2,025	----------	4,564	----------
Tennessee	85,633	81,155	----------	76,224	1,388	244,400	156,237
Texas	608,601	61,664	----------	34,945	390	705,600	73,329
Utah	1,152,592	15,931	----------	25,232	----------	1,193,755	106,367
Vermont	----------	3,073	----------	136	513	3,722	----------
Virginia	90,968	43,260	----------	39,755	122	174,105	415
Washington	----------	2,267	----------	5,822	----------	8,089	1,630
West Virginia	1,498,631	7,063	----------	30,279	10	1,535,983	168,431
Wisconsin	----------	115,832	----------	5,048	11,524	132,404	4,171
Wyoming	----------	----------	----------	4,001	1	4,002	138
Total	47,533,682	2,256,011	104,671	1,866,917	322,985	52,084,266	3,441,465
Exported	48,857	62,773	----------	211,974	2,162	325,766	11,467
Grand total	47,582,539	2,318,784	104,671	2,078,891	325,147	52,410,032	3,452,932

[1] Based upon reports from producers showing destination and principal end use of coke used and sold. Does not include imported coke, which totaled 126,518 tons in 1961.

but four were reported to have consumed foundry coke in 1961, and 63,000 tons was shipped to foreign countries. The principal foundry-coke-consuming centers are concentrated where foundries are manufacturing castings for the automotive, farm machinery, heavy machinery, railroad, and electrical equipment industries. The most important centers are Birmingham, Chicago, Cleveland, Detroit, Flint, Indianapolis, Lorain, Milwaukee, and Pittsburgh, which accounts for the large tonnages of foundry coke distributed to Alabama, Illinois, Indiana, Michigan, Ohio, Pennsylvania, and Wisconsin. These States consumed two-thirds of the total distribution of foundry coke.

Coke classified by the Bureau of Mines as "other industrial" was shipped to miscellaneous industrial plants in all but five States and the District of Columbia in 1961 for a wide variety of purposes such as smelting nonferrous metals and phosphate rock, lime burning, and for producing calcium carbide and rock wool. The use of coke for making producer gas and water gas was small, and shipments for residential and commercial heating were less than 1 percent of the total coke distributed.

Coke screenings or breeze was in heavy demand throughout 1961, and shipments were widespread. The principal uses for breeze were for sintering iron ore, smelting phosphate rock, and steam raising. The bulk of the breeze production, however, was used by the producing companies, and consequently, the leading producing States also led in consumption.

STOCKS OF COKE AND COKING COAL

Coke.—Producers' stocks of coke decreased 15 percent during 1961 and at yearend totaled 4,041,873 short tons. Despite the decrease of nearly 700,000 tons, stocks were higher than normal and were equal to 24 days' output at the December production rate. Usually stocks decrease when demand increases and the steady increase in industrial activity during the year caused stocks to diminish steadily. Nearly all of the coke in inventory at yearsend was oven coke as stocks of beehive coke were small and insignificant. As shown in table 34, 85 percent of the oven coke in stocks was blast-furnace grade, mostly at iron and steel coke plants. Stocks of foundry coke and other grades, mostly in small sizes, were small at furnace plants. Stocks at merchant plants were divided as follows: Blast-furnace coke, 57 percent; foundry coke, 11 percent; and residential heating and other grades of coke, 32 percent. Stocks of breeze at oven-coke plants remained fairly constant and decreased only about 55,000 tons. Of significance, however, was that nearly one-half of the breeze stocks were located in Indiana and were doubtlessly held for future use in agglomerating plants (sintering).

Coking coal.—Coking-coal stocks are of great importance to coke-plant operators because of the continuous nature of the carbonization process. For this reason, coke-plant operators endeavor to maintain adequate reserves of coking coal in the event of disruption to their normal supply, and a 30-day supply is generally considered the minimum necessary to meet any emergency. In 1961, stocks of bituminous coal declined slightly, falling nearly 700,000 tons between the beginning and end of the year (table 36). Stocks were lowest in July when mines were down for several weeks in the first half of the month due to the miners' vacation period. They increased slightly in subsequent months, and at the end of the year were sufficient for 44 days' supply at the prevailing consumption rate. Anthracite stocks are shown in table 37. Stocks of anthracite are small in comparison with bituminous coal because only a small percentage of anthracite is used and only at plants making foundry coke.

TABLE 34.—Producers' stocks of coke and breeze in the United States on Dec. 31, 1961, by States

(Short tons)

State	Coke				Breeze
	Blast furnace	Foundry	Residential heating and other	Total	
Oven coke:					
Alabama	656,931	11,355	58,557	726,843	52,771
California, Colorado, and Utah	304,726	----------	----------	304,726	24,541
Connecticut, Maryland, New Jersey, and New York	459,391	53,283	258,368	771,042	119,377
Illinois	43,086	----------	4,512	47,598	16,498
Indiana	1,033,196	1,848	24,532	1,059,576	691,770
Kentucky, Missouri, Tennessee, and Texas	40,393	12,697	2,875	55,965	15,632
Michigan	52,627	2,904	14,418	69,949	29,449
Minnesota and Wisconsin	77,302	41,586	72,727	191,615	64,166
Ohio	230,659	21,981	17,045	269,685	108,757
Pennsylvania	519,474	4,528	67	524,069	292,303
West Virginia	11,138	----------	----------	11,138	1,710
Total 1961	3,428,923	150,182	453,101	4,032,206	1,416,974
At merchant plants	689,389	134,961	387,557	1,211,907	130,453
At furnace plants	2,739,534	15,221	65,544	2,820,299	1,286,521
Total 1960	4,091,991	185,981	454,385	4,732,357	1,472,437
Beehive coke:					
Pennsylvania	3,767	----------	2,744	6,511	----------
Kentucky, Virginia, and West Virginia	837	----------	2,319	3,156	10,990
Total 1961	4,604	----------	5,063	9,667	10,990
Total 1960	4,755	----------	976	5,731	2,392

TABLE 35.—Producers' month-end stocks of oven coke in the United States

(Short tons)

Month	At merchant plants		At furnace plants		Total	
	1960	1961	1960	1961	1960	1961
January	1,509,752	1,337,584	2,693,321	3,463,118	4,203,073	4,800,702
February	1,335,244	1,379,696	2,528,636	3,401,315	3,863,880	4,781,011
March	1,169,297	1,411,536	2,489,886	3,285,272	3,659,183	4,696,808
April	1,142,022	1,470,229	2,591,367	3,255,884	3,733,389	4,726,113
May	1,108,945	1,477,644	2,652,030	3,094,246	3,760,975	4,571,890
June	1,080,945	1,429,531	2,786,014	2,927,995	3,866,959	4,357,526
July	1,111,927	1,469,756	2,937,947	2,883,777	4,049,874	4,353,533
August	1,149,724	1,410,627	3,095,476	2,890,850	4,245,200	4,301,477
September	1,171,635	1,329,121	3,254,113	2,771,993	4,425,748	4,101,114
October	1,192,112	1,270,520	3,410,894	2,764,154	4,603,006	4,034,674
November	1,212,300	1,227,906	3,468,534	2,795,792	4,680,834	4,023,698
December	1,279,999	1,211,907	3,452,358	2,820,299	4,732,357	4,032,206

TABLE 36.—Month-end stocks of bituminous coal at oven-coke plants in the United States

(Short tons)

Month	1957	1958	1959	1960	1961
January	12,796,209	13,217,378	12,123,513	11,428,017	10,483,155
February	12,801,976	12,096,279	11,801,729	11,241,870	9,788,567
March	13,254,278	11,906,462	11,684,172	11,148,141	9,551,136
April	13,285,465	11,781,534	11,569,096	11,324,365	9,331,749
May	13,895,620	11,585,237	11,837,123	11,916,169	9,851,556
June	13,978,054	11,787,762	12,424,398	12,391,359	9,932,172
July	11,717,007	10,039,582	9,566,108	10,342,992	8,495,602
August	12,503,701	10,118,979	9,394,516	10,742,409	8,936,261
September	13,006,022	10,523,274	9,261,161	10,918,346	9,135,237
October	13,935,303	11,666,111	9,375,872	11,082,639	9,813,136
November	14,002,603	12,335,715	10,127,812	11,203,784	10,452,933
December	14,092,205	12,939,358	11,495,611	11,028,816	10,392,751

TABLE 37.—Month-end stocks of anthracite at oven-coke plants in the United States

(Short tons)

Month	1957	1958	1959	1960	1961
January	129,330	118,859	87,314	77,724	74,624
February	127,418	101,751	71,101	65,831	62,092
March	119,472	89,855	49,463	50,517	50,036
April	114,369	82,121	61,706	55,222	51,222
May	110,412	81,514	73,204	67,100	54,241
June	125,664	82,716	84,874	71,499	57,494
July	111,649	73,007	74,957	68,800	58,947
August	134,686	91,358	95,529	86,143	59,811
September	147,258	97,399	96,480	89,366	73,292
October	145,879	112,265	106,230	108,090	98,923
November	145,051	113,980	117,243	107,542	109,281
December	138,085	103,599	108,893	92,848	98,381

VALUE AND PRICE

The average values and prices of oven and beehive coke produced and sold, as reported by producing companies, are shown in tables 38 and 39. As shown in table 38, the prices of oven and beehive coke rose only slightly between 1957–59 (average) and 1961. However, the average value per ton of oven coke produced in 1961 was 2 percent below the 1957–59 average and 3 percent below the 1960 figure. Coke prices follow coking-coal prices rather closely. The slight rise in prices of the various grades of coke in recent years was due largely to increased labor costs. For example, the increase in average prices of blast-furnace oven coke in 1961 over the base years 1957–59 was 1 percent while coke for residential heating decreased 0.2 percent (table 39). For beehive coke, blast-furnace grade advanced 7 percent; other industrial uses, 6 percent; and for residential heating, 45 percent; foundry coke decreased 4 percent. Prices on beehive coke are much lower than for oven coke because of the differences in coal transportation charges. Beehive coke is made near the coal deposits and generally has to be transported considerable distances to the consuming centers. The delivered prices on comparable grades of oven and beehive coke are usually quite similar.

TABLE 38.—Average value per short ton of coke produced in the United States and average receipts per short ton from coke sold (commercial sales)

Year	Value per ton produced			Receipts per ton sold		
	Oven coke	Beehive coke	Total	Oven coke	Beehive coke	Total
1957–59 (average)	$18.14	$14.70	$18.07	$20.06	$14.67	$19.29
1960	18.38	14.61	18.31	20.25	14.55	19.59
1961	17.80	15.08	17.76	21.14	15.13	20.55

TABLE 39.—Average receipts per short ton of coke sold (commercial sales), by uses

Year	Oven coke				Beehive coke			
	To blast-furnace plants	To foundries	To other industrial plants [1]	For residential heating	To blast-furnace plants	To foundries	To other industrial plants [1]	For residential heating
1957–59 (average)	$15.85	$29.39	$15.87	$17.15	$14.84	$16.72	$14.04	$11.64
1960	15.82	30.29	16.27	17.25	15.02	15.76	13.79	14.39
1961	15.98	30.07	16.67	17.12	15.94	16.02	14.94	16.87

[1] Includes water-gas plants.

FOREIGN TRADE [4]

Imports.—Imports of coke in 1961 varied only slightly from the preceding year and have averaged about 125,000 tons annually for the 5-year period 1957–61. Of the coke imported, all but 110 tons from Belgium-Luxembourg originated in Canada. Although imports of coke are small and represent less than one-half day's production, they are important in certain areas, particularly in the northwestern part of the United States where there are no coke plants to supply local requirements. Approximately one-half of the coke imported from Canada in 1961 entered the United States through the Montana and Idaho customs district. This coke was probably used in the lead and copper smelters of the northwest. The Michigan customs district was also one of the principal gateways for Canadian coke, accounting for 41 percent. The material coming through the Michigan customs district had a much lower average value and was probably screenings or breeze.

Exports.—Coke exports in 1961 increased 26 percent in quantity and 19 percent in value over 1960. Historically, the principal foreign market for American coke has been Canada. In the past decade, approximately four-fifths of all coke exported from the United States has been destined to Canada. Shipments to Canada, however, declined slightly from the 10-year average and represented only 77 percent of the total export movement of coke in 1961. The average value per ton of coke shipped to Canada in 1961 was $19.45, indicating that the bulk was industrial sizes, such as foundry coke, which always is sold for higher prices. Outside Canada, shipments totaled 101,787 tons or less than a day's production. Shipments to South America nearly tripled, owing largely to a cargo of more than 10,000 tons shipped to Peru. Shipments to Europe also rose because of the substantial quantity destined to Italy. Although grades or sizes of coke shipped to Italy were not shown in the Bureau of Mines compilation of Bureau of the Census data, the rather low average value per ton indicates that some of the coke was made up of small sizes.

---

[4] Figures on imports and exports compiled by Mae B. Price and Elsie D. Jackson, Division of Foreign Activities, Bureau of Mines, from records of the Bureau of the Census.

Exports to Asia were the highest on record mainly because of the large tonnage shipped to Japan. Until mid-1961 the Japanese government did not permit the importation of coke. An acute shortage of coke breeze in Japan in 1961, however, caused the government to lift the restrictions, and considerable quantities of breeze were imported. Beginning in June, the United States supplied 34,933 tons of coke breeze or about one-third the total imported by Japan during 1961. The average value per ton of coke breeze shipped to Japan was $10.67 f.o.b. loading port, which was $2.37 higher than the f.o.b. plant selling price.

TABLE 40.—Coke imported for consumption in the United States, by countries and customs districts

	1959		1960		1961	
	Short tons	Value	Short tons	Value	Short tons	Value
COUNTRY						
North America: Canada	123,145	$1,437,937	[1] 125,905	[1] $1,485,476	126,408	$1,539,486
Europe:						
Belgium-Luxembourg	---	---	440	12,863	110	3,230
Netherlands	110	3,325	---	---	---	---
Total	110	3,325	440	12,863	110	3,230
Grand total	123,255	1,441,262	[1] 126,345	[1] 1,498,339	126,518	1,542,716
CUSTOMS DISTRICT						
Buffalo	14,433	158,825	[1] 1,430	[1] 17,436	1,468	11,422
Dakota	207	1,784	---	---	---	---
Hawaii	110	3,325	440	12,863	110	3,230
Maine and New Hampshire	126	2,209	102	1,995	95	1,615
Michigan	47,895	406,817	[1] 53,413	[1] 449,248	52,361	447,202
Minnesota	---	---	---	---	49	352
Montana and Idaho	52,950	769,924	58,452	856,709	63,003	941,638
St. Lawrence	---	---	75	2,543	---	---
Vermont	127	2,033	66	1,190	110	1,745
Washington	7,407	96,345	12,367	156,355	9,322	135,512
Total	123,255	1,441,262	[1] 126,345	[1] 1,498,339	126,518	1,542,716

[1] Revised figure.

Source: Bureau of the Census.

TABLE 41.—Coke exported from the United States, by countries and customs districts

	1959		1960		1961	
	Short tons	Value	Short tons	Value	Short tons	Value
COUNTRY						
North America:						
Canada	379,466	$6,967,478	301,704	$5,707,215	343,445	$6,679,762
Mexico	4,648	171,967	9,757	251,784	7,691	218,958
Panama	150	10,371	128	9,345	45	2,002
West Indies:						
Cuba	26,383	538,553	23,584	515,210	------	------
Trinidad and Tobago	220	4,783	------	------	116	2,522
Other West Indies	136	8,994	140	3,949	30	960
Other North America	30	1,405	106	5,224	80	2,293
Total	411,033	7,703,551	335,419	6,492,727	351,407	6,906,497
South America:						
Argentina	5,536	83,524	------	------	------	------
Bolivia	337	10,687	------	------	------	------
Brazil	31,055	646,013	5,058	115,281	5,706	141,147
Chile	2,270	35,632	513	16,120	391	11,486
Equador	78	3,685	64	2,588	148	2,897
Peru	68	2,800	73	2,800	10,224	186,196
Uruguay	------	------	471	10,500	------	------
Venezuela	16	533	17	1,302	37	884
Other South America	61	2,856	54	2,238	156	3,555
Total	39,421	785,730	6,250	150,829	16,662	346,165
Europe:						
Belgium-Luxembourg	------	------	5	673	68	1,360
Italy	------	------	59	981	32,964	412,080
Norway	15	630	30	1,260	------	------
Sweden	539	14,553	1,549	40,113	------	------
United Kingdom	5	588	20	2,587	214	4,100
Total	559	15,771	1,663	45,614	33,246	417,540
Asia:						
Hong Kong	378	13,500	------	------	------	------
India	------	------	------	------	967	20,578
Japan	3	507	------	------	34,933	372,744
Korea, Republic of	8,118	134,998	9,249	176,609	7,146	125,797
Philippines	710	19,525	435	19,500	871	23,250
Total	9,209	168,530	9,684	196,109	43,917	542,369
Grand total	460,222	8,673,582	353,016	6,885,279	445,232	8,212,571
CUSTOMS DISTRICT						
Buffalo	113,894	2,115,497	84,525	1,665,055	104,501	2,046,371
Chicago	5,073	50,968	20,862	331,479	44,824	706,577
Dakota	10,567	299,903	10,843	296,538	9,410	281,360
Duluth and Superior	6,764	173,588	5,512	129,107	3,094	78,599
Florida	938	34,372	574	19,926	59	1,092
Laredo	3.481	124,060	6,898	191,984	6.224	187,831
Los Angeles	------	------	1,751	15,327	14,128	153,745
Maryland	396	15,064	144	5,237	500	10,978
Massachusetts	15,120	280,475	------	------	48,006	644,170
Michigan	190,252	3,710,820	149,780	2,832,632	156,623	3,110,461
Mobile	904	35,139	4,358	98,718	701	19,239
New Orleans	2,359	47.721	328	18,965	11,622	125,954
New York	49,156	973,346	30,205	653,176	11,746	248,565
Ohio	20,000	166,250	14,100	131,835	3,000	25,764
Philadelphia	7,113	147,994	3,912	77,307	7,538	108,356
St. Lawrence	8,109	140,195	12.612	212,272	18,597	318,198
San Diego	987	38,880	970	39,416	794	23,315
Virginia	220	4,783	2,020	50,613	116	2,522
Washington	3,194	107,109	3,337	109,421	3,443	113.320
Wisconsin	14,824	128,983	------	------	------	------
Other districts	6,871	78,435	285	6,271	306	6,154
Total	460,222	8,673,582	353,016	6,885,279	445,232	8,212,571

Source: Bureau of the Census.

TECHNOLOGY

A large amount of research in recent years has been devoted to finding methods of producing metallurgical fuel from noncoking or poorly coking coals, and several interesting processes have been developed in the United States that now are in the pilot stage or in limited commercial production. All, however, require considerably more processing than conventional coking procedures.

One process, developed jointly by U.S. Fuel Co., a subsidiary of U.S. Smelting, Refining, and Mining Co., and the Victor Chemical Div. of Stauffer is reported to be capable of producing high-quality coke pellets and coal chemicals from western coals by pelletizing coal fines and subjecting the pellets to treatment with natural gas in a carbonizing retort. The process requires 18,000 cu ft of natural gas per ton of coal processed, and about 1 hour and 20 minutes for carbonizing. About 8,000 cu ft of gas is required for thermal-decomposition reactions, and the remainder is used for external heating of the retort and the preheater. The pellets range in size from five-sixteenths to seven-eighths of an inch and have a volatile content of less than 1 percent, a sulfur content of 0.5 percent, and an ash content of about 10 percent. The process also yields about 45 to 50 gallons of oils and tars per ton of coal and from 18,000 to 25,000 cu ft of gas that contains 85 percent hydrogen. A commercial plant based upon the above process was under construction at the end of 1961 near U.S. Smelting's lead-zinc flotation mill at Midvale, Utah.

Another process for converting low-grade western coals into coke is currently being developed by FMC Corp. and U.S. Steel Corp. at Kemmerer, Wyo. Details of the process have not been released, but reportedly, it is a two-stage process involving low-temperature carbonization and briquetting, followed by high-temperature carbonization of the briquets. Test quantities of metallurgical coke were produced in a $3.5-million demonstration plant, and preliminary tests indicated that this fuel could satisfactorily replace coke at electric furnace phosphorus plants. Unlike the U.S. Smelting-Stauffer Chemical process, FMC expects to produce both large and small coke; the small sizes for phosphate furnaces and the larger sizes (reportedly up to 3 inches) for iron blast furnaces. The process does not yield coal-chemical materials commonly associated with coking operations.

A method for upgrading noncoking coals to metallurgical fuel will be tested in a $300,000 pilot plant to be built by the Pacific Power and Light Co. adjacent to its coal-fired electric generating plant near Glenrock, Wyo. No details on the process were released, but the firm announced that it does not involve low-temperature carbonization, hydrogenation, or oxidation. If successful, the plant will produce electrode coke for aluminum reduction, char or residue for boiler fuel to generate electric power, and chemical liquids.

Another nonconventional method of coking was developed several years ago by the Shawinigan Chemical Co. of Montreal, Quebec, Canada. The Shawinigan Process, utilizing a traveling-chain grate stoker, is a continuous process that produces chemical-grade coke or char by oxidizing coal with controlled air from a plenum chamber under a chain grate and then carbonizing the coal on the grate at

2,000°–2,200° F. Hot coke is discharged from the end of the grate into a shaft furnace where it is further devolatilized and dry-quenched with flue gas, leaving the furnace at about 350° F. As with the above processes, this method is important because it can use a wide range of coals that normally would be considered unfit for coking. By the end of 1961, at least five companies in five States had production or experimental chain-grate stoker plants in operation, and total annual coke capacity was estimated at 230,000 tons.

In the area of coal chemicals, increasing competition from petroleum-derived high purity benzene and naphthalene has promoted the development of new processes for removing sulfur from coke-oven benzene, naphthalene, and BTX mixtures. Two processes, hydrogenation and Udex extraction, currently are used at several large plants in the United States. Both, however, require a large capital investment that many smaller plants cannot afford.

Two new processes for treating BTX mixtures that require a relatively small capital outlay have recently been developed by the U.S. Industrial Chemical Co. Both use metallic sodium that reacts with thiophene and other sulfur impurities to form compounds that can be withdrawn or remain behind. One is a mechanically agitated system; the other works on the principle of fluidized solids. The mechanical system employs a heated ribbon blender in which metallic sodium in an inert carrier reacts with sulfur impurities to form sodium sulfide which, subsequently, is withdrawn from the bottom of the reactor while sulfur-free benzene is recovered from the top. This method is recommended for plants that process up to 10,000 gallons of light oil per day. For larger plants a fluidized-solids system is recommended. This method also uses metallic sodium in an inert carrier, but thiophene is removed by treating hot benzene-toluene vapors with sodium. Both units can reduce thiophene content from 500 to 1,000 ppm to less than 1 ppm.

The same company also developed a process for desulfurizing naphthalene with sodium. This system adds sodium directly to a reaction kettle where, under agitation, it quickly emulsifies and reacts with sulfur impurities. The process can operate with a batch system that will process 10 million pounds of naphthalene or a continuous system that can process 50 million pounds.

Progress was made in many countries of the world on mechanization or automation of coke-oven operations. A system for automatically charging conventional coke ovens with electrically-controlled charging cars was under development in the U.S.S.R. The system encompasses a programmed relay complex that completely controls the movement and operation of the charging car and performs all charging operations without an attendant. The sequence of operations is effected by a selector that, on the completion of each operation, advances one step and supplies the order for the next programmed operation. The completion of each operation is supervised by appropriate limit switches and the completion of a cycle by a stop relay. The operation of the car is interlocked with the coke pusher and the pneumatic equipment of the coal bins.

The installation of automatic and centralized control systems at the Murton coking facility of the National Coal Board in Durham County, England, since 1958 resulted in large savings in manpower and general increased efficiency in overall operations. The application of these systems at the coke plant reduced manpower requirements to the extent that operation of each of the major units, excluding the ovens, is controlled by 1 man, and 21 fewer men are required for the overall operation than for a conventional plant of the same capacity. At the coal-handling plant the entire operation is controlled from a desk that incorporates colored finger switches for operating all coal-handling and crushing equipment and signals in advance the start of various units. Including the controller, only four men are required to operate the entire coal-handling unit compared to eight men required in a conventional plant. The flow of coke through the screening station is continuous also, and a single operator controls the complete primary and secondary screenings operations, including the weighing, loading, and marshaling of railroad cars. The entire operation is controlled from a desk with finger switches for sequence starting, which separates large coke, five graded sizes of other coke, and breeze. Five men operate this entire unit, whereas 13 are required for a conventional plant. The byproduct plant is a completely self-operating unit except that an operator monitors a graphic control panel from which various corrections and changes are made when needed. Including the controller, 12 men operate this plant, whereas 21 men are required for a conventional byproduct plant. Oven manpower was not appreciably reduced, however, because coking is still essentially a batch process, and the equipment available requires a relatively fixed number of operators.

Bureau of Mines technological and investigative studies relating to coal carbonization were conducted in 1961 at Coal Research Centers in Morgantown, W. Va., and Pittsburgh, Pa., the Coal Research Laboratory in Denver, Colo., and the Lignite Research Laboratory in Grand Forks, N. Dak.

Research work at Pittsburgh included studies on the carbonizing properties of American coals, coking-coal expansion, reduction of the coking properties of coal by controlled oxidation, thermal decomposition of tar, and the mechanism of coking. In its continuing survey on carbonizing properties of American coals, the Bureau tested 52 coals from 18 counties in West Virginia and one from Ohio in the BM–AGA retort at a wall temperature of 900° C.

In an effort to prepare a satisfactory feed for high-pressure gasifiers, tests were made to determine the feasibility of reducing the coking power of coal by controlled oxidation. Oxidation was accomplished by passing air through the coal bed at a velocity of 7 feet per second at maximum temperatures of 200° to 360° C for periods of ¾ to 5½ hours. The effectiveness of oxidation was judged by visual inspection of the residue obtained after carbonization in the BM–AGA 7-inch retort at a wall temperature of 800° C. Results showed that, under such conditions, the coking properties of the Pittsburgh coal could not be reduced sufficiently within a reasonable time to prepare a satisfactory fuel for fixed-bed gasification.

To obtain basic information on coal carbonization that could be applied to the development of new uses for coal, the Bureau made a systematic investigation of various ranks and types of American coals. This study determined specific reaction-rate constants for the evolution of the volatile matter of coals and blends at temperatures within the plastic range and found that the constants were related to temperature and rank and type of coal, and were, to a limited degree, indicative of the comparative reaction mechanism of the various coals. The rate of decay of the plastic phase of carbonization was found to be lineally related to the quantity of chloroform-soluble extract in chars from carbonization for various periods of time at the temperature of maximum fluidity.

At Denver, advancements were made in the technique of carbonizing coking coal by continuous vertical entrainment. Previous investigative studies on the principles of entrainment carbonization were concerned chiefly with noncoking coals, mainly lignites. In 1961, however, this work was extended to coking coals. Ordinarily these coals are difficult to carbonize satisfactorily in a continuous vertical entrainment system because the coal particles soften under the influence of heat and plug the reactors. Several unusual operating techniques were developed to prevent agglomerating and plugging the reactor, and several coking coals were processed without any difficulty.

Bench-scale work on carbonization under pressure also was conducted at Denver in 1961. These studies were made by using a new specially designed pressure retort that removed tar vapors by a continuous upswing of hot nitrogen before they had undergone thermal decomposition. Gas-swept pressure assays at several temperatures were made on two coals, a bituminous high-volatile B and dried lignite.

By applying the principles of entrainment drying and carbonization previously used only with coal, active low-ash carbons and substantial quantities of wood tar, gas, and water vapor were produced from crushed wood waste at Denver in 1961. Two typical wood wastes were processed, a hardwood (oak), containing 25 percent moisture, and redwood, containing 38 percent moisture. Each waste was reduced to about 2 percent moisture by entrainment drying before carbonization, and charcoal yields ranged from 10 to 19 percent of the raw wastes as received at the laboratory. Exploratory tests also were made to determine the briquetting properties of the charcoals.

A study of the technical factors related to the production of special carbon and tar from selected Wyoming coals was also made at Denver.[5]

At the Lignite Research Laboratory, fundamental data were obtained on the influence of carbonizing temperatures and other process conditions on the properties of lignite char. Five coals, including two lignites, two subbituminous coals, and one steam-dried lignite, were carbonized in a hydrogen- or nitrogen-rich atmosphere at 940° F at pressures ranging from atmospheric to 1,000 psig. The effect of processing pressures on yields and composition of carbonization products were determined, and the results of this one phase of the investigation were published in a special report.[6]

Research work on low-temperature tar at Grand Forks, during 1961 centered on the development of a simplified assay procedure.

---

[5] Landers, W. S., Parry, V. F., Gomez, M., Wagner, E. O., Goodman, J. B., and Nelson, C. R. Carbonization Properties of Wyoming Coals. BuMines Rept. of Inv. 5731, 1961, 74 pp.

[6] Porter, R. B., Oppelt, W. H., and Kube, W. R. Low-Temperature Carbonization of Lignite and Subbituminous Coal: Effect of Hydrogen Atmosphere to 1,000 pounds pressure. BuMines Rept. of Inv. 5804, 1961, 25 pp.

The objective of this project was an assay requiring little or no exposure to excessive temperature, and the work concentrated chiefly on developing a procedure based on chromatographic analysis. The most effective procedure was found to be a quick distillation to cracking temperature, removal of waxes from the distillate by urea adduction or solvent treatment, followed by chromatographic analysis. Excellent results were obtained on tar fractions boiling below 270° C.

Investigative studies on the characterization or identification of components in low-temperature tars were continued at Morgantown. This work had two objectives: (1) The characterization of pitch, with particular emphasis on the resins, and (2) the characterization of tar distillates which, unlike the resins, can be characterized with respect to individual compounds.

Three methods, spectral characterization, ring analysis, and pyrolysis of structural units, were used to determine the structure of resins. All three methods showed that resins are not necessarily the highly refractory substances previously supposed, but that with appropriate treatment they could be converted to substances of commercial value. In the characterization research on tar distillates and tar bases, approximately 130 individual compounds were identified, and the amounts of each in a given fraction were determined or estimated. Also, the ultraviolet and infrared spectra of 189 individual tar acids and tar bases were determined. All of the characterization work done on low-temperature tar distillates was presented in a single publication.[7]

The upgrading and utilization studies were aimed at increasing the value of low-temperature tar. Although this material can be used satisfactorily as a residual-type fuel, its chemical content has greater potential value, and this phase of the investigation was concerned with upgrading the products recovered by such refining processes as distillation, solvent extraction, absorption, and adduct formation. Several methods were investigated for upgrading pitch, but no definite results were obtained. Tests indicated, however, that an air-blowing method may be practical and provide a material suitable for use as coke binder, electrode material, road surfacing, protective coating, and roofing material.

One part of the research was concerned with the separation and dealkylation of the alkylnaphthalenes that are a potential source of phthalic anhydride.

Other studies were directed at converting high-boiling tar acids into low-boiling phenols, oxidizing tar hydrocarbon to produce phthalic anhydride, producing resins from the alkylnaphthalene fraction, and, from the tar, extracting straight-chain olefins that are in demand for producing a new type of detergent.

An annual world review of pyrolysis of coal was published in Industrial and Engineering Chemistry, August 1961. This review summarized research and technologic studies relating to the following phases of coal pyrolysis: (1) Mechanism, kinetics, and thermochemistry, (2) low- and high-temperature carbonization, and (3) oven operations, products, and byproducts.

---

[7] Karr, Jr., Clarence, Estep, Patricia A. Lo Chang, Ta-Chuang, and Comeriati, Joseph R. Identification of Distillable Tar Acids and Tar Bases from a Low-Temperature Bituminous Coal Tar. BuMines Bull. 591, 1961, 228 pp.

WORLD REVIEW

The production of metallurgical coke throughout the world in 1961 was estimated at 305,961,000 short tons, a slight decrease from estimated production in 1960. Production decreased in the United States, Mexico, six European countries, two South American countries, and two Asiatic countries. Production increases in other countries (chiefly in Japan and the U.S.S.R.), however, were approximately equivalent to the decreases.

As shown in table 42, Europe produced 65 percent of the estimated world output. The U.S.S.R. was the largest producer with 33 percent of the European production and 21 percent of the world total. This was the fourth consecutive year that output in the U.S.S.R. has surpassed that in all other countries. Estimates based upon published data indicate that about 70 percent of the total production was used in blast furnaces, reflecting the heavy demand for coke by the metallurgical industries of the Soviet Union. West Germany, the second largest European producer, ranked third in world output. Production, however, was slightly lower than in 1960. The United Kingdom, France, Poland, and Czechoslovakia also produced large quantities of coke.

Fifteen percent of the total coke was produced in Asia. China was the chief producer with more than one-half the total. Production in China, however, decreased more than 3 million tons from 1960. Japan, the second largest Asiatic producer, had 27 percent of the output. Japan's production increased substantially over the preceding year.

Three North American countries, the United States, Canada, and Mexico, produced coke. All but about 8 percent was produced in the United States. The United States had 17 percent of the world output and ranked second in production.

Four South American countries, two countries in Africa, and three in Oceania also produced coke. Their combined production, however, was only 2 percent of the total. Of these countries, Australia was the largest producer with a production of approximately 3 million tons.

Table 43 shows coke produced in gas retorts by low- and medium-temperature processes and from lignite or brown coals. Production of this type, often called soft coke, was only about one-sixth as large as hard-coke production. The leading producers of soft coke were Great Britain and East Germany, which together produced 45 percent of the world total. In Great Britain most of this coke was produced from bituminous coal in gas retorts; 30 percent of the East German output was derived from brown coal. The East German lignite coke was probably a carbonized briquet because lignite is noncoking. Other large producers were West Germany, Japan, Czechoslovakia, and India.

TABLE 42.—World production of oven and beehive coke (excluding breeze), by countries [1]

(Thousand short tons)

Country	1957	1958	1959	1960	1961
North America:					
Canada	3,803	3,313	4,095	3,873	3,900
Mexico	755	657	751	920	831
United States	75,951	53,604	55,864	57,229	51,711
Total	80,509	57,574	60,710	62,022	56,442
South America:					
Brazil	568	634	574	776	771
Chile	325	284	261	258	[2] 275
Colombia	276	331	273	463	220
Peru	34	36	35	33	37
Total	1,203	1,285	1,143	1,530	1,303
Europe:					
Austria	2,414	2,082	1,943	2,255	1,963
Belgium	7,888	7,613	7,955	8,310	7,994
Bulgaria	13	11	10	20	[2] 55
Czechoslovakia	8,251	8,124	8,684	9,323	9,409
Finland	-----------	-----------	11	11	[2] 17
France	13,897	13,783	14,482	14,999	14,823
Germany:					
East [3]	862	1,097	1,108	1,200	[2] 1,200
West [4]	54,739	52,639	47,251	49,252	48,992
Hungary	216	369	399	550	[2] 770
Italy	4,064	3,704	3,366	4,095	4,296
Netherlands [5]	4,721	4,545	4,550	5,024	5,020
Poland	11,156	11,722	11,992	12,437	13,506
Rumania	480	621	671	904	1,036
Spain	2,077	2,261	2,653	2,837	2,585
Sweden	131	103	133	148	265
U.S.S.R	53,610	56,101	58,863	61,950	[2] 64,600
United Kingdom	22,950	20,665	19,093	21,093	19,967
Yugoslavia	1,143	1,135	1,179	1,194	1,210
Total	188,612	186,575	184,343	195,602	197,708
Asia:					
China [2]	7,400	19,800	24,300	27,600	24,300
India	2,983	3,386	4,739	5,267	[2] 7,275
Iran [6]	10	10	23	[2] 23	[2] 23
Japan	6,910	6,510	7,848	9,424	12,030
Korea, North [2]	440	470	500	550	550
Turkey	603	614	583	583	562
Total	18,300	30,800	38,000	43,400	44,700
Africa:					
Rhodesia and Nyasaland, Federation of: Southern Rhodesia	255	211	207	258	[2] 265
Union of South Africa	1,770	1,980	2,205	2,364	2,421
Total	2,025	2,191	2,412	2,622	2,686
Oceania:					
Australia	2,549	2,574	2,507	2,949	3,038
New Caledonia [2]	78	78	77	77	77
New Zealand	7	7	[2] 7	7	[2] 7
Total	2,634	2,659	2,591	3,033	3,122
World total	293,283	281,084	289,199	308,209	305,961

[1] Includes revisions of data published previously.
[2] Estimate.
[3] High-temperature coke from lignite.
[4] Including electrode coke but excluding an estimated 100,000 tons of low-temperature coke.
[5] Including breeze.
[6] Year ended March 20 of year following that stated.

Compiled by Liela S. Price, Division of Foreign Activities.

TABLE 43.—World production of gashouse, low- and medium-temperature coke (excluding breeze) by countries [1]

(Thousand short tons)

Country [2]	1957	1958	1959	1960	1961
North America:					
Canada	(3)	(3)	(3)	(3)	(3)
United States, retort, low- and medium-temperature	(3)	(3)	(3)	(3)	(3)
Total	270	285	275	275	150
South America:					
Argentina [4]	55	61	61	66	66
Chile	95	95	94	[4] 95	[4] 95
Uruguay	32	33	31	35	25
Total	182	189	186	196	186
Europe:					
Austria	445	357	276	250	273
Belgium	4	4	1	--------	--------
Czechoslovakia:					
Gashouse	691	724	713	686	[4] 690
Lignite	2,280	2,306	2,406	2,399	[4] 2,400
Denmark	422	340	369	439	[4] 440
Finland	118	139	150	152	[4] 130
France:					
Gashouse [5]	1,690	1,484	1,124	780	480
Low-temperature	310	304	317	439	306
Germany:					
East:					
Gashouse	3,106	3,303	3,456	3,534	[4] 3,470
Lignite	7,303	7,254	7,205	[4] 7,990	[4] 8,160
West:					
Gashouse	6,019	5,467	5,527	5,754	5,454
Lignite	643	659	656	664	662
Low-temperature	138	125	112	80	98
Greece	24	23	21	[4] 28	[4] 28
Hungary	538	517	517	547	[4] 500
Ireland (Eire)	95	90	91	[4] 95	[4] 95
Italy	1,026	913	882	899	850
Luxembourg	40	40	39	37	[4] 44
Netherlands [6]	725	625	482	322	257
Norway [6]	62	54	54	52	42
Poland:					
Gashouse	1,065	1,065	1,081	1,077	[4] 1,100
Low-temperature [4]	110	110	110	110	110
Portugal	37	43	39	43	44
Spain	280	297	300	273	[4] 300
Sweden	736	697	680	659	[4] 660
Switzerland	561	505	515	534	[4] 330
United Kingdom:					
Great Britain	13,457	12,483	11,279	11,050	10,998
Northern Ireland	129	[4] 130	[4] 130	[4] 130	[4] 130
Yugoslavia	28	29	23	22	19
Total	44,600	42,700	41,900	42,400	41,400
Asia:					
Ceylon [4]	13	13	13	13	13
Hong Kong [6]	21	20	22	20	10
India:					
Gashouse	127	137	142	141	140
Low-temperature	1,928	2,000	1,995	2,002	[4] 2,000
Japan:					
Gashouse	3,328	3,182	3,554	4,101	4,185
Low-temperature [4]	75	75	75	85	85
Malaya [4]	19	22	22	22	22
Taiwan [7]	162	203	190	214	207
Turkey:					
Gashouse	111	121	[4] 130	110	133
Low-temperature	88	89	91	93	91
Total	6,060	6,300	6,675	7,300	7,330

See footnotes at end of table.

TABLE 43.—World production of gashouse, low- and medium-temperature coke (excluding breeze) by countries [1]—Continued

(Thousand short tons)

Country [2]	1957	1958	1959	1960	1961
Africa:					
Algeria	101	97	98	98	[4] 95
Union of South Africa	97	92	81	67	111
United Arab Republic (Egypt)[4]	28	28	28	33	33
Total	226	217	207	198	239
Oceania:					
Australia [8]	1,034	931	914	850	[4] 1,040
New Zealand [9]	82	82	79	80	86
Total	1,116	1,013	993	930	1,126
World total	52,450	50,700	50,240	51,300	50,430

[1] Gashouse coke unless otherwise specified. Includes revisions of data published previously. Data do not add to totals shown, owing to rounding.
[2] Production data for China, Mexico, Rumania, and U.S.S.R. not available: estimates included in total.
[3] Concealed to avoid disclosing individual company figures. Production included in total.
[4] Estimate.
[5] Data previously reported represented commercially disposable production.
[6] Includes breeze.
[7] Includes other cokes.
[8] Year ended June 30 of year stated.
[9] Year ended March 31 of year following that stated.

Compiled by Liela S. Price, Division of Foreign Activities.

COAL-CHEMICAL MATERIALS

GENERAL SUMMARY

The principal or basic coal-chemical materials recovered through the high-temperature carbonization of bituminous coal in slot-type coke ovens are gas, ammonia, crude light oil, and tar. When processed further, these basic products yield hydrogen, ammonium sulfate, di- and mono-ammonium phosphate, benzene, toluene, xylene, naphthalene, phenol, creosote oil, pitch, and other coal chemicals. The yield of the basic chemical raw materials (ammonia, crude light oil, and tar) amounts to approximately 8 percent of the coal carbonized, fuel gas amounts to about 17 percent, and the balance or about 75 percent is converted into coke and breeze. The relative yields of the individual coal-chemical materials during the past 4 decades are shown graphically in figure 5. Yields are affected to a certain extent by the kind of coal carbonized, operating techniques, and recovery equipment used by the producing companies. Yields were highest during the mid-1930's when operating rates of the ovens were low and coking cycles were longer than normal because of the small demand for coke. They declined in the 1940's when oven operations (high oven temperatures and shorter coking cycles) were adjusted to provide maximum coke production to meet unusually heavy demand. During the 1950's surplus gas and crude light oil yields leveled off, but the tar yield increased, while ammonia recovery, in terms of sulfate equivalent, decreased. This graph shows, therefore, that while yields fluctuated slightly from year to year, the 1961 yields, although slightly higher than in 1960, were not much different than in the mid-1920's.

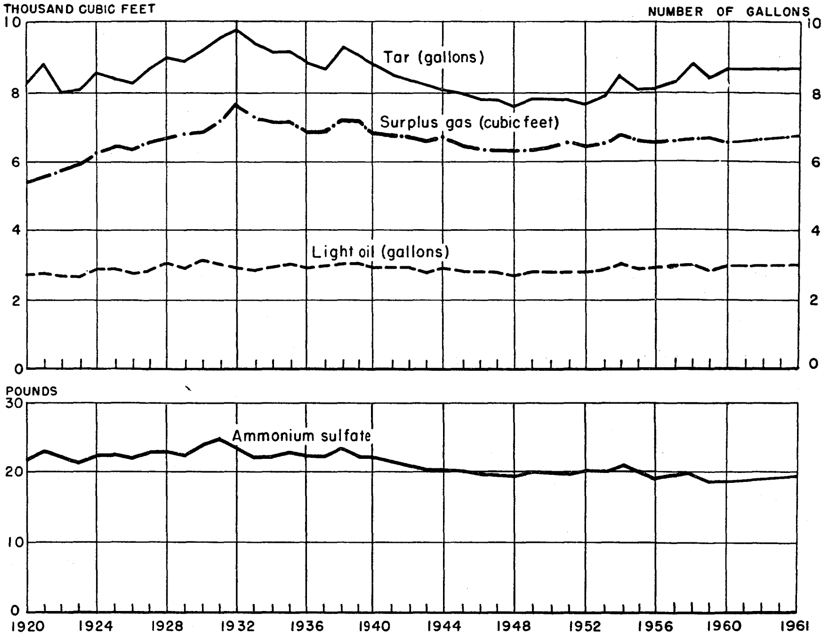

FIGURE 5.—Average yield of principal coal-chemical materials per short ton of coal carbonized in coke ovens. Yields of light oil and ammonium sulfate equivalent represent average for plants recovering these products.

Although yields of coal-chemical materials in 1961 showed little change when compared with 1920 averages, there has been a decided shift in the values contributed by the various coke-oven products. Probably the most significant change has occurred with respect to the value credited to coke-oven gas. As shown in figure 6, the value credited to surplus gas in the early 1930's amounted to 24 percent of

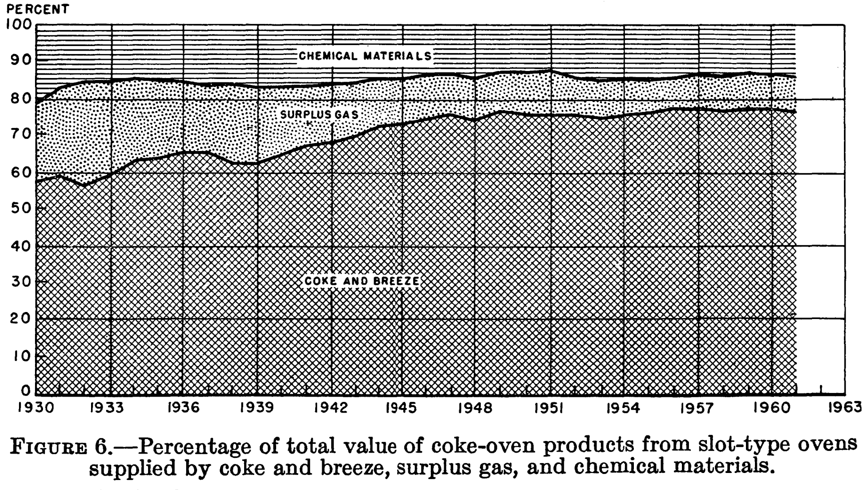

FIGURE 6.—Percentage of total value of coke-oven products from slot-type ovens supplied by coke and breeze, surplus gas, and chemical materials.

TABLE 44.—Coal-chemical materials, exclusive of breeze, produced at coke-oven installations in the United States in 1961 [1]

Product	Produced	Sold			On hand Dec. 31
		Quantity	Value		
			Total	Average	
Tar, crude .... gallons..	633,377,790	[2] 326,624,206	$41,621,671	$0.127	38,991,923
Tar derivatives:					
Sodium phenolate or carbolate..do....	3,153,147	3,223,422	582,079	.181	194,984
Crude chemical oil (tar acid oil)..do....	28,981,445	28,615,340	6,835,208	.239	923,042
Pitch-of-tar: [3]					
Soft .... short tons..	898,700	182,354	4,129,258	22.644	32,256
Medium .... do....	44,817	27,861	917,976	32.948	4,594
Hard .... do....	231,617	64,733	2,251,854	34.787	2,338
Other tar derivatives [4]	--------	--------	13,764,080	--------	--------
Ammonia products:					
Sulfate .... short tons..	593,578	537,730	16,207,037	30.139	191,172
Liquor (NH_3 content) .... do....	13,363	10,938	833,451	76.198	1,854
Diammonium and monoammonium phosphate .... do....	47,651	54,422	6,007,671	110.390	8,120
Total	--------	--------	23,048,159	--------	--------
Sulfate equivalent of all forms short tons..	693,064	634,582	--------	--------	--------
NH_3 equivalent of all forms ..... do....	178,672	163,595	--------	--------	--------
Gas:					
Used under boilers, etc..M cubic feet..	[5] 777,948,787	59,525,177	11,553,102	.194	--------
Used in steel or allied plants....do....		386,602,775	89,094,589	.230	--------
Distributed through city mains..do....		23,894,346	10,102,971	.423	--------
Sold for industrial use .... do....		19,958,042	3,548,034	.178	--------
Total .... do....	777,948,787	489,980,340	114,298,696	.233	--------
Crude light oil .... gallons..	[6] 214,002,542	18,518,713	3,249,445	.175	3,989,800
Light oil derivatives:					
Benzene:					
Specification grades (excluding motor grade) .... do....	120,205,300	113,271,937	34,773,585	.307	10,297,311
Motor grade .... do....	1,027,397	1,018,034	197,648	.194	35,420
Toluene (all grades) .... do....	28,406,752	27,420,529	5,937,794	.217	2,363,856
Xylene (all grades) .... do....	7,563,945	7,280,896	1,922,198	.264	939,930
Solvent naphtha (crude and refined) do....	4,515,937	4,384,198	1,105,838	.252	384,314
Other light oil derivatives .... do....	3,512,090	1,483,315	209,922	.142	267,672
Total .... do....	165,231,421	154,858,909	44,146,985	.285	14,288,503
Intermediate light oil .... do....	4,436,717	4,344,947	662,914	.153	234,571
Value of all coal-chemical materials sold...	--------	--------	255,508,325	--------	--------

[1] Includes products of tar distillation conducted by coke-oven operators under same corporate name.
[2] Includes 29,999,402 gallons sold to affiliated companies for refining.
[3] Soft—water-softening point less than 110° F; medium—from 110° to 160° F; hard—over 160° F.
[4] Creosote oil, cresols, cresylic acid, naphthalene, phenol, pyridine, refined tar, and tar paint.
[5] Includes gas used for heating ovens and gas wasted.
[6] 198,580,921 gallons refined by coke-oven operators to make derived products shown.

the value of all products. The chemical raw materials (ammonia, light oil, and tar products) supplied an additional 17 percent, or if taken together amounted to over 41 percent of the value of all coke-oven products. In subsequent years, however, the values contributed by surplus gas and other coal-chemical materials decreased, whereas the value of coke and breeze increased. This shift may be attributed to the replacement of coke-oven gas by natural gas for residential and commercial heating in nearly all of the principal gas-consuming areas and also to the rapidly growing petrochemical industry, which influenced prices. Consequently, coke, the principal product has supported the increase in manufacturing cost (coal, labor, and supplies) of all of the coke-oven products. Since 1939, the average cost per ton of coal delivered to oven coke plants increased 161 percent, whereas the average value of coal-chemical materials, including breeze, increased only 84 percent. In the same period, the average value of coke increased 269 percent. In 1961, the proportion of the total value of coal-chemical materials credited to surplus gas and coal chemicals was smaller than the proportion furnished by surplus gas alone in the 1930's.

Percentages of coal costs recovered by the various product groups are given in table 46. Because coal costs represent a substantial part of the conversion costs of manufacturing coke and coal chemicals, relating product values to coal values provides some measure of the economic importance of these products of coal carbonization. Although there has been little change since the mid-1950's in this relationship, it was quite different in 1929 when more than 67 percent of the coal cost was recovered by surplus gas and coal chemicals. In the following 10-year period (1930–39), the value of surplus gas and coal chemicals declined to about 60 percent of the coal costs. Since the mid–1940's the value of surplus gas and coal chemicals has ranged between 34 and 40 percent.

TABLE 45.—Average value of coal-chemical materials used or sold and of coke and breeze produced per short ton of coal carbonized in the United States

Product	1957–59 (average)	1960	1961
Ammonia products	$0.307	$0.274	$0.317
Light oil and its derivatives	.687	.739	.661
Surplus gas used or sold	1.592	1.577	1.572
Tar and its derivatives (including naphthalene):			
Tar burned by producers [1]	.427	.407	.328
Sold	.828	.850	.964
Total	3.841	3.847	3.842
Coke produced	12.749	12.956	12.447
Breeze produced	.308	.344	.345
Grand total	16.898	17.147	16.634

[1] Includes pitch-of-tar.

TABLE 46.—Value of coal recovered by coal-chemical materials in the United States

(Percent)

	1957–59 (average)	1960	1961
Product:			
Ammonia products	3.1	2.8	3.2
Light oil and its derivatives	6.9	7.5	6.7
Surplus gas used or sold	16.1	15.9	16.1
Tar and its derivatives used or sold (including naphthalene)	12.7	12.7	13.2
Total	38.8	38.9	39.2
Value of coal per short ton	$9.90	$9.89	$9.79

TABLE 47.—Coal equivalent of the thermal materials, except coke, produced at oven-coke plants in the United States

Year	Materials produced				Estimated equivalent in heating value [1] (billion Btu)					Coal equivalent (thousand short tons)
	Coke breeze (thousand short tons)	Surplus gas (billion cubic feet)	Tar (thousand gallons)	Light oil (thousand gallons)	Coke breeze	Surplus gas	Tar	Light oil	Total	
1913	735	64	115, 145	3, 000	14, 700	35, 200	17, 272	390	67, 562	2, 600
1918	1, 999	158	263, 299	87, 562	39, 980	86, 900	39, 495	11, 383	177, 758	6, 785
1929	4, 853	508	680, 864	200, 594	97, 060	279, 400	102, 130	26, 077	504, 667	19, 262
1939	3, 354	434	554, 406	170, 963	67, 080	238, 700	83, 161	22, 225	411, 166	15, 693
1949	4, 929	546	672, 407	228, 754	98, 580	300, 300	100, 861	29, 738	529, 479	20, 209
1957–59 (average)	4, 077	568	732, 173	244, 118	81, 532	312, 400	109, 826	31, 735	535, 493	20, 439
1960	3, 705	521	687, 560	234, 501	74, 100	286, 550	103, 134	30, 485	494, 269	18, 865
1961	3, 337	490	633, 378	214, 003	66, 740	269, 500	95, 007	27, 820	459, 067	17, 522

[1] Breeze, 10,000 Btu per pound; gas, 550 Btu per cubic foot; tar, 150,000 Btu per gallon; and light oil, 130,000 Btu per gallon.

The value of coal-chemical materials sold, including surplus gas used by producing companies, totaled $255,508,325, a decrease of 7 percent from 1960 and 29 percent below the record established in 1957.

COKE-OVEN GAS

In terms of calorific content, coke-oven gas ranks next to coke; consequently, nearly all of the production is used as fuel. Yields of coke-oven gas have remained relatively uniform for the past decade and averaged 10.7 thousand cubic feet per ton of coal carbonized in 1961. Generally about one-third of the gas recovered is used to heat the ovens, and the remainder (surplus gas) is used as boiler fuel, in metallurgical furnaces, and for residential, commercial, and industrial heating. Although coke-oven gas is composed of hydrogen, methane, ethylene, and other chemical raw materials, only a small fraction of the total output undergoes chemical processing. At two plants, part of the coke-oven gas is processed for the recovery of hydrogen which in turn is used to make synthetic ammonia. Because there are less than three companies utilizing coke-oven gas in this manner, statistics on the quantity used for this purpose cannot be shown and they are included under the classification "in steel or allied plants."

Detailed statistics showing the production and disposal of coke-oven gas, by uses and States, are shown in tables 48 and 49. Table 48 shows, by States, the production, quantity used for underfiring, surplus used or sold, and gas wasted or unaccounted for. Table 49 gives a breakdown of the surplus gas showing the quantity and value of gas used by producers under boilers and in steel or allied plants as well as the quantity and value of sales. As shown in these tables, the bulk of the gas produced at furnace plants is used by the producing companies mainly in steel or allied plants. In 1961 this group of plants consumed over 97 percent of their surplus gas, most of which was used in metallurgical furnaces (melting, heating, and annealing furnaces). Merchant plants used only about one-fourth of their surplus and sold the balance for residential heating and cooking and commercial and industrial heating. The quantity of coke-oven gas distributed through city mains continued to decline in 1961 and amounted to approximately 5 percent of the total as compared with about 25 percent in the late 1940's. As shown in table 49, the average value per thousand cubic feet of the coke-oven gas distributed through city mains was much higher than for any other purpose. Until the 1950's, receipts from these sales affected the revenue obtained from coal-chemical materials. Because so little gas was sold for this purpose in 1961, however, revenue from sales did not influence the returns from coal-chemical materials.

Table 50 shows the quantities of the different kinds of gas used for underfiring the coke ovens and indicates that most of the oven heating in 1961 was done with coke-oven gas. Next to coke-oven gas, in terms of coke-oven gas equivalent, was blast-furnace gas, which is used by a number of steel companies. Until the late 1940's, producer gas ranked next to coke-oven gas in oven heating, principally because many merchant-coke plants used producer gas for underfiring so that virtually all of their coke-oven gas could be distributed through city mains.

TABLE 48.—Production and disposal of coke-oven gas in the United States in 1961, by States

(Thousand cubic feet)

State	Produced		Used in heating ovens	Surplus used or sold			Wasted
	Total	Per ton of coal coked		Quantity	Value		
					Total	Average	
Alabama	52, 036, 367	9. 64	25, 982, 280	24, 417, 712	$3, 300, 904	$0. 135	1, 636, 375
California, Colorado, and Utah	54, 105, 967	11. 31	14, 662, 536	39, 137, 627	7, 911, 530	. 202	305, 804
Connecticut, Maryland, New Jersey, and New York	98, 451, 124	11. 06	26, 547, 661	71, 071, 089	24, 983, 931	. 352	832, 374
Illinois	27, 885, 946	10. 32	7, 037, 740	20, 069, 780	3, 212, 997	. 160	778, 426
Indiana	128, 860, 348	11. 88	47, 286, 886	79, 934, 259	16, 073, 424	. 201	1, 639, 203
Kentucky, Missouri, Tennessee, and Texas	25, 162, 767	10. 24	11, 389, 691	10, 807, 814	1, 567, 394	. 145	2, 965, 262
Michigan	40, 853, 948	9. 99	6, 216, 542	34, 513, 982	8, 572, 047	. 248	123, 424
Minnesota and Wisconsin	9, 322, 993	9. 65	5, 027, 571	4, 203, 997	845, 861	. 201	91, 425
Ohio	95, 797, 388	10. 01	39, 208, 204	55, 438, 287	14, 587, 795	. 263	1, 150, 897
Pennsylvania	200, 874, 971	10. 55	80, 676, 667	118, 781, 449	26, 122, 201	. 220	1, 416, 855
West Virginia	44, 596, 968	11. 30	12, 638, 014	31, 604, 344	7, 120, 612	. 225	354, 610
Total 1961	777, 948, 787	10. 70	276, 673, 792	489, 980, 340	114, 298, 696	. 233	11, 294, 655
At merchant plants	72, 555, 692	9. 44	31, 253, 290	40, 480, 414	12, 077, 124	. 298	821, 988
At furnace plants	705, 393, 095	10. 85	245, 420, 502	449, 499, 926	102, 221, 572	. 227	10, 472, 667
Total 1960	835, 292, 413	10. 47	299, 779, 713	520, 776, 250	125, 735, 415	. 241	14, 736, 450

TABLE 49.—Surplus coke-oven gas used by producers in the United States and sold in 1961, by States

(Thousand cubic feet)

State	Used by producers—					
	Under boilers, etc.			In steel or allied plants		
	Quantity	Value		Quantity	Value	
		Total	Average		Total	Average
Alabama	8,364,867	$1,053,230	$0.126	12,924,506	$1,782,329	$0.138
California, Colorado, and Utah	(1)	(1)	(1)	36,103,060	7,494,131	.208
Connecticut, Maryland, New Jersey, and New York	(1)	(1)	(1)	55,380,394	17,552,485	.317
Illinois	1,397,191	110,188	.079	18,672,589	3,102,809	.166
Indiana	9,109,150	1,762,685	.194	67,731,457	12,818,222	.189
Kentucky, Missouri, Tennessee, and Texas	4,891,656	604,438	.124	(1)	(1)	(1)
Michigan	(1)	(1)	(1)	28,290,071	6,802,018	.240
Minnesota and Wisconsin	1,732,090	333,035	.192	(1)	(1)	(1)
Ohio	8,956,563	2,165,608	.242	40,058,490	11,137,364	.278
Pennsylvania	17,315,694	3,565,083	.206	96,066,303	21,132,034	.220
West Virginia	(1)	(1)	(1)	(1)	(1)	(1)
Undistributed	7,757,966	1,958,835	.252	31,375,905	7,273,197	.232
Total 1961	59,525,177	11,553,102	.194	386,602,775	89,094,589	.230
At merchant plants	6,601,388	1,118,503	.169	2,927,781	668,764	.228
At furnace plants	52,923,789	10,434,599	.197	383,674,994	88,425,825	.230
Total 1960	66,368,699	13,107,186	.197	394,535,298	94,850,750	.240

State	Sold					
	Distributed through city mains			For industrial use		
	Quantity	Value		Quantity	Value	
		Total	Average		Total	Average
Alabama	(1)	(1)	(1)	(1)	(1)	(1)
California, Colorado, and Utah	----------	----------	--------	(1)	(1)	(1)
Connecticut, Maryland, New Jersey, and New York	15,300,354	$7,301,505	$0.477	(1)	(1)	(1)
Illinois	----------	----------	--------	----------	----------	--------
Indiana	(1)	(1)	(1)	(1)	(1)	(1)
Kentucky, Missouri, Tennessee, and Texas	(1)	(1)	(1)	(1)	(1)	(1)
Michigan	----------	----------	--------	(1)	(1)	(1)
Minnesota and Wisconsin	(1)	(1)	(1)	(1)	(1)	(1)
Ohio	----------	----------	--------	6,423,234	$1,284,823	$0.200
Pennsylvania	(1)	(1)	(1)	(1)	(1)	(1)
West Virginia	----------	----------	--------	(1)	(1)	(1)
Undistributed	8,593,992	2,801,466	.326	13,534,808	2,263,211	.167
Total 1961	23,894,346	10,102,971	.423	19,958,042	3,548,034	.178
At merchant plants	16,581,394	7,605,801	.459	14,369,851	2,684,056	.187
At furnace plants	7,312,952	2,497,170	.341	5,588,191	863,978	.155
Total 1960	29,777,016	11,964,585	.402	30,095,237	5,812,894	.193

---

[1] Included with "Undistributed" to avoid disclosing individual company figures.

TABLE 50.—**Coke-oven gas and other gases used in heating coke ovens in the United States in 1961, by States** [1]

(Thousand cubic feet)

State	Coke-oven gas	Producer gas	Blast-furnace gas	Natural gas	Total coke-oven gas equivalent
Alabama	25,982,280	---	---	10,999	25,993,279
California, Colorado, and Utah	14,662,536	---	8,384,237	550,110	23,596,883
Connecticut, Maryland, New Jersey, and New York	26,547,661	1,880,314	10,463,362	1,479,927	40,371,264
Illinois	7,037,740	---	4,837,422	---	11,875,162
Indiana	47,286,886	---	11,192,020	8,419,978	66,898,884
Kentucky, Missouri, Tennessee, and Texas	11,389,691	---	---	---	11,389,691
Michigan	6,216,542	---	11,963,541	88,378	18,268,461
Minnesota and Wisconsin	5,027,571	180,000	---	---	5,207,571
Ohio	39,208,204	---	2,049,190	---	41,257,394
Pennsylvania	80,676,667	---	1,394,313	458,726	82,529,706
West Virginia	12,638,014	---	5,770,218	---	18,408,232
Total 1961	276,673,792	2,060,314	56,054,303	11,008,118	345,796,527
At merchant plants	31,253,290	2,060,314	---	1,253,589	34,567,193
At furnace plants	245,420,502	---	56,054,303	9,754,529	311,229,334
Total 1960	299,779,713	2,618,546	58,301,358	9,471,548	370,171,165

[1] Adjusted to an equivalent of 550 B.t.u. per cubic foot.

CRUDE COAL TAR AND DERIVATIVES

Crude coal tar is recovered at all oven-coke plants, and output depends on the quantity of coal carbonized. The 9-percent decrease in coal charged into slot-type coke ovens reduced the output of crude tar by 8 percent although the yield of tar per ton of coal carbonized increased nine-hundredths of a gallon. Tar yields have shown an upward trend in the past decade. Tar yields among plants vary widely depending on the rank and grade of coal carbonized, oven temperatures, completeness of tar recovery, and other factors. In 1961, the yield of tar ranged between 5.1 and 11.5 gallons per ton of coal. As noted in table 51, tar yields were largest in West Virginia, the western States (California, Colorado, and Utah), and Pennsylvania. The lowest yield was in Minnesota and Wisconsin, principally because a substantial part of the coke produced was foundry coke, requiring high percentages of low-volatile bituminous coal and anthracite fines in coking-coal admixtures which reduced tar yields.

Crude tar may be used as a fuel or processed into various tar derivatives. Until the 1930's approximately one-half of the crude tar produced was used by the producing companies as metallurgical fuel, and the remainder was processed, mostly by tar distillers. Only about 6 to 10 percent, however, of the production was processed by the coke-oven operators themselves. Beginning in the late 1930's, a number of the larger coke plants began the practice of partially refining or topping their crude tar. This process enabled these companies to recover and market between 20 and 25 percent, by weight, of their crude tar in the form of crude chemical oil (tar acid oil) and naphthalene; the residue, or soft pitch, was used as metallurgical fuel.

Small plants generally cannot construct and operate tar-processing facilities profitably, and consequently, such plants usually sell their entire output to tar distillers. Practically all the processing plants operated by the coke-oven operators are associated with iron and steel works which can burn either the crude tar or soft pitch. These plants can distill, sell, or burn their crude tar depending on economic conditions. In 1961, the Bethlehem Steel Co. started construction of a large tar-distillation plant at Sparrows Point, Md. According to information in trade journals, this plant, when completed early in 1962, will be able to process 50 million gallons of crude tar annually from which about 42 million pounds of naphthalene, plus substantial

TABLE 51.—Coke-oven tar produced in the United States, used by producers, and sold in 1961, by States

(Gallons)

State	Produced		Used by producers—		
	Total	Per ton of coal coked	For refining or topping [1]	As fuel	Otherwise
Alabama	40,404,771	7.49	17,465,515	166,823	10,527
California, Colorado, and Utah	47,496,047	9.93	21,843,408	5,149,881	130,063
Connecticut, Maryland, New Jersey, and New York	82,427,877	9.26	22,928,733	8,396,606	50,193
Illinois	20,714,926	7.66	----------	----------	----------
Indiana	81,901,424	7.55	40,146,501	1,129,740	----------
Kentucky, Missouri, Tennessee, and Texas	17,764,224	7.23	----------	----------	23,275
Michigan	30,519,294	7.46	----------	----------	6,500
Minnesota and Wisconsin	6,352,882	6.57	----------	----------	2,950
Ohio	82,144,032	8.58	7,981,934	131,440	83,987
Pennsylvania	183,542,790	9.64	135,799,795	1,835,412	631,204
West Virginia	40,109,523	10.16	30,798,678	----------	----------
Total 1961	633,377,790	8.71	276,964,564	16,809,902	938,699
At merchant plants	53,392,282	6.95	786,355	----------	----------
At furnace plants	579,985,508	8.92	276,178,209	16,809,902	938,699
Total 1960	687,559,703	8.62	275,310,320	85,146,218	713,721

State	Sold for refining into tar products [2]			On hand Dec. 31
	Quantity	Value		
		Total	Average	
Alabama	24,004,610	$3,172,123	$0.132	2,626,701
California, Colorado, and Utah	21,120,224	2,673,163	.127	1,643,701
Connecticut, Maryland, New Jersey, and New York	50,858,392	5,610,609	.110	4,993,925
Illinois	19,804,859	2,662,977	.134	1,527,594
Indiana	38,429,817	5,165,524	.134	3,527,364
Kentucky, Missouri, Tennessee, and Texas	17,719,392	2,237,215	.126	339,791
Michigan	28,924,857	3,865,713	.134	2,500,789
Minnesota and Wisconsin	6,282,456	813,567	.129	730,502
Ohio	70,624,713	9,063,715	.128	6,775,019
Pennsylvania	39,663,099	5,183,914	.131	12,990,715
West Virginia	9,191,787	1,173,151	.128	1,335,822
Total 1961	326,624,206	41,621,671	.127	38,991,923
At merchant plants	52,290,047	6,735,649	.129	2,539,220
At furnace plants	274,334,159	34,886,022	.127	36,452,703
Total 1960	333,253,840	42,640,937	.128	25,587,405

[1] Includes 1,266,789 gallons also included with "Sold for refining into tar products".

[2] Comprises 29,999,402 gallons valued at $3,805,407 sold to affiliated companies and 296,624,804 gallons valued at $37,816,264 sold to other purchasers. Also includes small amount exported.

quantities of tar acids, will be recovered and marketed. Most of the tar at this operation has been burned in crude form in previous years. In 1961, 44 percent of the tar output was processed by producing companies of which two-thirds was only topped. The increase in capacity of tar-processing facilities at oven-coke plants in recent years has reduced the quantity of crude tar available for fuel purposes. Between 1951 and 1960 an average of 16 percent of the annual output of crude tar was used as fuel. In 1961, the quantity used as fuel dropped to the lowest figure on record and amounted to only 3 percent of the production. Sales of crude tar to tar distillers in the same period (1951–60) averaged about 389 million gallons or 51 percent of the total output. Sales for this purpose in 1961 were somewhat lower than the 10-year average and amounted to slightly more than 327 million gallons.

The principal tar derivatives made at oven-coke plants are creosote oil, crude chemical oil (tar acid oil), naphthalene, and pitch. Other tar products are phenol, cresylic acid, and various grades of cresols. There were not enough companies reporting production of these and other tar bases to the Bureau of Mines to permit publication of statistics on these products. Accordingly, these data collected by the Bureau were transmitted to the United States Tariff Commission. This agency then combined these data with similar data they collected from tar distillers and published the combined total in their monthly and annual reports on synthetic organic chemicals.

Two of the major tar derivatives for which statistics are shown in this report are crude chemical oil (tar acid oil) and pitch. Production of crude chemical oil increased 5 percent over 1960, while sales increased 5 percent in quantity and 19 percent in value. Crude chemical oil is sold mainly to tar distillers, and nearly all is processed further to make various tar acids such as cresylic acid, cresols, and naphthalene. When topping or partially refining the crude tar, the bulk of the tar remains as a residue and is called pitch. The kind of pitch made depends on the extent to which the tar is subjected to thermal distillation. The Bureau of Mines classifies pitch into three grades based on softening temperatures. Until recent years, most of the pitch produced at coke plants was used as metallurgical fuel. Demand for pitch products in recent years has steadily increased, and coke-oven operators have given more attention to the production and marketing of various kinds of pitch. As a result sales have steadily increased, and in 1961, 275,000 tons of pitch valued at $7.3 million was sold. Coal-tar pitch is used in a number of industrial applications such as binder material in carbon-electrode manufacture, pipe-coating enamel, roofing material, road construction and maintenance, and pitch-fibre-pipe manufacture. Pitch is also used for various other products such as core binders (sand-core binders for casting), target pitch (clay pigeons), specialty castings and sealers, and the manufacture of pitch coke. Unfortunately, statistics on the quantities of pitch sales for each major end use are not available, but according to estimates made by industry representatives, the largest market is in the manufacture of electrode carbon.

COKE-OVEN AMMONIA

In 1961, coke-oven ammonia was recovered at 63 plants of which 51 made ammonium sulfate; 10, ammonia liquor; 3, diammonium phosphate; 1, monoammonium phosphate and ammonium sulfate; and 1, ammonium sulfate and ammonia liquor. The yield of ammonia, in terms of sulfate equivalent, increased slightly and averaged 19.42 pounds per ton of coal carbonized. Total output of ammonia decreased 32 percent below the record set in 1957. Although coke ovens were the principal source of chemical nitrogen up to the beginning of World War II, the 1961 output was less than 6 percent of the national production. Most of the ammonia recovered at coke plants is converted into ammonium sulfate and is used as fertilizer for agricultural purposes. In 1961, 86 percent of the ammonia was converted into sulfate, 7 percent was recovered in the form of ammonia liquor, and 7 percent was made into diammonium and monoammonium phosphate. The ammonium phosphates, which contain more than 3 times as much plant-food nutrients as ammonium sulfate, sold for a correspondingly higher price and most is used as fertilizer material. A new use that could develop into a substantial market is as a fire-retardant to combat forest, brush, and grass fires.[8] Ammonia liquor is used in industry and in agriculture, but data are not collected from the producing companies on the quantities sold for such purposes. Some of the major industrial uses are for manfacturing soda ash, ammonium chloride, sulfuric acid, and household ammonia.

For the first time since 1958, the average prices of ammonia products sold by coke-plant operators increased. The average price per ton of ammonium sulfate sold, f.o.b. plant, increased $1.14; ammonia liquor, in terms of NH_3 content, increased $8.54; and di- and mono-ammonium phosphate; increased $1.49.

CRUDE LIGHT OIL AND DERIVATIVES

Crude light oil was recovered at 64 of the 70 active oven-coke plants in 1961, and production decreased 9 percent from the 1960 total. As is true with the other coal-chemical materials, the total output of crude light oil is governed by the quantity of coal carbonized. The yield of light oil also varies among plants although the industry average has not changed to a large extent in the past several years. The 1961 average yield of 3 gallons per ton of coal carbonized was, however, the highest yield reported since 1931. Virtually all of the crude light oil obtained from coal carbonization is recovered from the gas stream by absorption with a higher boiling petroleum wash oil. Although crude tar contains a slight amount of crude light oil, only a small percentage of the total industry output is obtained through the processing of crude tar. The petroleum wash oil, which is laden with about 3 percent light oil, is then distilled with direct steam in a stripping still to effect the release of the light oil. The light oil is then fractionally distilled into benzene, toluene, xylene, solvent naphtha, and naphthalene.

---

[8] W. G. Schulze. Diammonium Phosphate from Phosphate Rock and Coal to Fertilizer and Fire Retardant. Blast Furnace, Coke Oven and Raw Materials Committee Proc., AIME, v. 20, 1961, pp. 188-221.

TABLE 52.—Coke-oven ammonia produced in the United States and sold in 1961, by States

(Short tons)

State	Active plants [1]	Produced			
		Sulfate equivalent	Pounds per ton of coal coked	As sulfate [2]	As liquor (NH_3 content)
Alabama	7	60,079	22.27	59,334	(3)
California, Colorado, and Utah [4]	4	57,404	24.01	57,404	---
Connecticut, Maryland, New Jersey, and New York [5]	6	84,874	19.07	80,126	(3)
Illinois	4	28,270	21.77	28,270	---
Indiana	5	86,046	15.87	76,314	(3)
Kentucky, Tennessee, and Texas	3	19,001	19.08	(3)	(3)
Michigan [4]	4	33,438	16.36	(3)	(3)
Minnesota and Wisconsin	2	5,068	13.48	(3)	(3)
Ohio	12	84,890	18.74	71,403	(3)
Pennsylvania	13	192,939	20.29	192,939	---
West Virginia	3	41,055	20.80	41,055	---
Undistributed	---	---	---	34,384	13,363
Total 1961	63	693,064	19.42	641,229	13,363
At merchant plants	14	72,512	20.04	29,870	10,993
At furnace plants	49	620,552	19.35	611,359	2,370
Total 1960	66	735,441	18.80	677,710	14,884

State	Sold [6]				On hand Dec. 31	
	As sulfate [2]		As liquor (NH_3 content)		Sulfate [2]	Liquor (NH_3 content)
	Quantity	Value	Quantity	Value		
Alabama	59,542	$1,989,292	(3)	(3)	19,241	10
California, Colorado, and Utah [4]	65,801	5,380,177	---	---	16,566	---
Connecticut, Maryland, New Jersey, and New York [5]	75,496	2,289,883	(3)	(3)	12,463	34
Illinois	25,933	859,859	---	---	5,112	---
Indiana	63,137	2,021,569	(3)	(3)	34,196	726
Kentucky, Tennessee, and Texas	(3)	(3)	(3)	(3)	936	283
Michigan [4]	(3)	(3)	(3)	(3)	7,525	47
Minnesota and Wisconsin	(3)	(3)	(3)	(3)	273	131
Ohio	57,684	1,858,802	(3)	(3)	25,617	623
Pennsylvania	174,448	4,918,652	---	---	70,202	---
West Virginia	39,093	1,060,648	---	---	7,161	---
Undistributed	31,018	1,835,826	10,938	$833,451	---	---
Total 1961	[7] 592,152	22,214,708	10,938	833,451	199,292	1,854
At merchant plants	28,588	1,158,393	9,189	710,095	6,044	1,187
At furnace plants	563,564	21,056,315	1,749	123,356	193,248	667
Total 1960	630,631	21,208,838	9,397	635,833	151,019	734

[1] Number of plants that recovered ammonia.

[2] Includes diammonium and monoammonium phosphate.

[3] Included with "Undistributed" to avoid disclosing individual company figures.

[4] Figures include diammonium phosphate.

[5] Figures include monoammonium phosphate.

[6] Includes 38,975 tons of ammonium sulfate and diammonium phosphate valued at $1,992,716 exported.

[7] Comprises 537,730 tons of ammonium sulfate valued at $16,207,037 and 54,422 tons of diammonium and monoammonium phosphate valued at $6,007,671.

The light oil derivatives are made by the fractional distillation of the light oil. Approximately 95 percent of the light oil recovered in coking operations is refined by the producing companies. The total yield of saleable products usually ranges between 80 and 85 percent of the light oil. Statistics showing the yield of the individual light-oil products in 1961 and several preceding years are given in table 54.

As shown in this table, benzene is recovered in the largest volume from the refining of light oil. Until the 1950's, coke-oven crude light oil was the only source of this important aromatic chemical. Dynamic advancements in the processing of crude petroleum, which had previously developed methods of manufacturing toluene and xylene, led to economic methods of making benzene from this raw material in the early 1950's. Production of benzene from petroleum rose rapidly in subsequent years, and in 1961 about two-thirds of the benzene, three-fourths of the toluene, and four-fifths of the xylene were produced from petroleum feed stocks. Production of benzene by coke-plant operators, tar distillers, and petroleum refiners is shown in table 57.

TABLE 53.—Coke-oven crude light oil produced in the United States and derived products produced and sold in 1961, by States

(Gallons)

State	Active plants [1]	Crude light oil				Derived products		
		Produced	Per ton of coal coked	Refined on premises [2]	On hand Dec. 31	Produced	Sold [3]	
							Quantity	Value
Alabama	7	13,553,624	2.51	12,893,681	585,151	9,891,758	9,309,569	$2,703,934
California, Colorado, and Utah	4	15,307,720	3.20	15,296,913	274,946	13,007,655	11,275,119	2,998,015
Connecticut, Maryland, New Jersey, and New York	6	29,638,576	3.33	31,616,196	465,411	26,171,434	24,959,678	7,207,698
Illinois	4	8,185,073	3.15	5,673,480	191,691	4,474,720	4,298,055	1,219,830
Indiana	4	30,091,704	2.90	29,427,423	96,648	25,682,874	24,810,412	7,322,288
Kentucky, Missouri, Tennessee, and Texas	5	6,369,486	2.59	2,988,235	159,233	2,445,271	2,270,753	623,777
Michigan and Wisconsin	5	12,302,882	2.75	7,656,555	267,772	6,229,997	6,014,593	1,679,400
Ohio	12	26,274,898	2.80	22,666,485	427,895	17,714,450	17,088,432	4,713,929
Pennsylvania	14	60,601,939	3.18	58,691,067	1,483,092	49,439,281	44,960,993	13,041,032
West Virginia	3	11,676,640	2.96	11,670,886	37,961	10,173,981	9,871,305	2,637,082
Total 1961	64	214,002,542	3.00	198,580,921	3,989,800	165,231,421	154,858,909	44,146,985
At merchant plants	14	16,288,902	2.43	9,855,810	916,985	8,393,114	8,212,979	2,373,135
At furnace plants	50	197,713,640	3.06	188,725,111	3,072,815	156,838,307	146,645,930	41,773,850
Total 1960	67	234,500,663	2.99	218,242,334	3,320,402	182,843,164	184,191,134	54,441,663

[1] Number of plants that recovered crude light oil.
[2] Includes small quantity of material also reported in sales of crude light oil in table 44.
[3] Excludes 18,518,713 gallons of crude light oil valued at $3,249,445 sold as such.

TABLE 54.—Yield of light-oil products from refining crude light oil at oven-coke plants in the United States

(Percent)

Year	Benzene		Toluene (all grades)	Xylene (all grades)	Solvent naphtha (crude and refined)	Other light-oil products
	Motor	All other grades				
1929	54.4	12.8	9.4	(1)	3.7	3.4
1939	48.6	15.4	12.1	2.5	2.9	3.8
1949	9.5	55.6	12.5	3.3	2.3	3.2
1957-59 (average)	.5	60.4	13.5	3.9	2.1	2.3
1960	.4	62.0	13.9	3.7	2.1	1.7
1961	.5	60.5	14.3	3.8	2.3	1.8

[1] Included with "solvent naphtha (crude and refined)".

TABLE 55.—Light-oil derivatives produced at oven-coke plants in the United States and sold in 1961, by States

(Gallons)

State	Benzene (all grades except motor)				Toluene (all grades)			
	Produced	Yield from crude light oil refined (percent)	Sold		Produced	Yield from crude light oil refined (percent)	Sold	
			Quantity	Value			Quantity	Value
Alabama	7,330,077	56.9	6,879,494	$2,155,879	1,773,644	13.8	1,579,228	$340,822
California, Colorado, and Utah	9,066,912	59.3	7,766,048	2,189,638	1,838,185	12.0	1,859,267	397,162
Illinois	3,459,998	61.0	3,324,214	1,001,316	760,366	13.4	734,500	163,765
Indiana	20,190,649	68.6	19,950,796	6,247,878	3,684,084	12.5	3,313,903	702,195
Maryland and New York	19,534,914	61.8	18,416,789	5,709,589	4,882,691	15.4	4,764,401	1,064,231
Michigan and Wisconsin	4,802,653	62.7	4,745,828	1,415,436	851,924	11.1	728,571	167,407
Missouri, Tennessee, and Texas	1,919,923	64.2	1,839,179	526,948	328,524	11.0	311,688	70,718
Ohio	12,856,352	56.7	12,845,733	3,780,250	2,879,696	12.7	2,728,325	622,225
Pennsylvania	33,879,287	57.7	30,593,139	9,720,153	9,359,973	15.9	9,378,412	1,992,502
West Virginia	7,164,535	61.4	6,910,717	2,026,498	2,047,665	17.5	2,022,234	416,767
Total 1961	120,205,300	60.5	113,271,937	34,773,585	28,406,752	14.3	27,420,529	5,937,794
At merchant plants	6,061,847	61.5	5,917,347	1,887,082	1,338,689	13.6	1,317,270	300,489
At furnace plants	114,143,453	60.5	107,354,590	32,886,503	27,068,063	14.3	26,103,259	5,637,305
Total 1960	135,326,446	62.0	137,784,200	44,166,604	30,398,543	13.9	31,566,744	6,638,373

State	Xylene (all grades)				Solvent naphtha (crude and refined)			
	Produced	Yield from crude light oil refined (percent)	Sold		Produced	Yield from crude light oil refined (percent)	Sold	
			Quantity	Value			Quantity	Value
Alabama	531,084	4.1	545,297	$153,343	177,732	1.4	222,334	$42,549
California, Colorado, and Utah	356,548	2.3	336,420	91,314	623,735	4.1	609,161	157,931
Illinois	163,335	2.9	147,320	39,791	(1)	(1)	(1)	(1)
Indiana	454,876	1.5	450,838	119,278	1,059,327	2.5	966,007	242,716
Maryland and New York	1,288,974	4.1	1,320,445	363,547	(2)	(2)	(2)	(2)
Michigan and Wisconsin	221,041	2.9	201,278	51,616	(1)	(1)	----------	----------
Missouri, Tennessee, and Texas	142,728	4.8	80,980	21,442	54,096	1.8	38,906	4,669
Ohio	1,082,889	4.8	1,001,637	217,191	429,707	1.9	420,470	84,996
Pennsylvania	2,645,649	4.5	2,527,171	708,860	2,086,450	2.3	2,058,546	565,255
West Virginia	676,821	5.8	669,510	155,816	84,890	.7	68,774	7,722
Total 1961	7,563,945	3.8	7,280,896	1,922,198	4,515,937	2.3	4,384,198	1,105,838
At merchant plants	346,232	3.5	352,898	97,157	45,509	.5	35,889	8,762
At furnace plants	7,217,713	3.8	6,927,998	1,825,041	4,470,428	2.4	4,348,309	1,097,076
Total 1960	8,075,608	3.7	7,853,506	2,061,013	4,586,363	2.1	4,578,240	1,209,360

[1] Included with Indiana.
[2] Included with Pennsylvania.

The principal uses for benzene are in manufacturing intermediate organic chemicals such as styrene, phenol, aniline, and adipic acid, which in turn are used to make finished products such as synthetic rubber, plastics, dyes, pharmaceuticals, synthetic fibers, detergents, and many others. End uses for benzene have been estimated for a number of years by the Coal-Chemicals Committee of the American Coke and Coal Chemicals Institute. Their latest estimates are shown in table 59.

TABLE 56.—Benzene and toluene produced at oven-coke plants in the United States, by grades

(Gallons)

Year	Benzene				Toluene		
	Motor	Nitration (1° C.)	Industrial (2° C.)	All other	Nitration (1° C.)	Industrial (2° C.)	All other
1941	106,372,000	15,414,500	18,286,400	4,182,600	14,689,800	13,268,500	1,378,900
1949	20,923,700	28,988,700	91,717,300	2,035,600	20,808,300	6,317,200	545,100
1957–59 (average)	1,240,500	83,881,700	50,045,700	5,193,600	24,810,700	6,196,400	(1)
1960	769,900	100,907,000	32,536,800	1,882,600	24,129,300	6,269,200	(1)
1961	1,027,400	85,648,800	33,111,900	1,444,600	22,820,100	5,586,700	(1)

[1] Included with "Industrial" to avoid disclosing individual company figures.

TABLE 57.—Production of benzene (excluding Motor grade) in the United States [1]

(Thousand gallons)

Year	From tar distilleries [2]					From coke-oven operations				
	Produced	Percent of total	Sold			Produced	Percent of total	Sold		
			Quantity	Value				Quantity	Value	
				1,000 dollars	Average per gallon				1,000 dollars	Average per gallon
1957–59 (average)	27,130	8.4	16,948	$6.377	$0.38	139,121	43.2	138,058	$43,924	$0.32
1960	12,787	2.8	635	187	.29	135,326	29.6	137,784	44,167	.32
1961	12,355	2.3	(3)	(3)	(3)	120,205	22.0	113,272	34,774	.31

Year	From petroleum refineries					Total				
	Produced	Percent of total	Sold			Produced	Percent of total	Sold		
			Quantity	Value				Quantity	Value	
				1,000 dollars	Average per gallon				1,000 dollars	Average per gallon
1957–59 (average)	155,694	48.4	128,417	$40,864	$0.32	321,945	100.0	283,423	$91,165	$0.32
1960	309,210	67.6	239,003	73,209	.31	457,323	100.0	377,427	117,563	.31
1961	412,819	75.7	307,739	99,348	.32	545,379	100.0	421,011	134,122	.32

[1] U.S. Tariff Commission.
[2] Includes benzene made from imported crude light oil.
[3] Not available.

The United States was a net importer of benzene between 1947 and 1961, receiving as much as 69.5 million gallons in 1956. The steadily growing benzene-producing capacity of the petroleum industry has reduced the need for imports. For the first time since 1947, exports of benzene exceeded imports as 46,468,377 gallons valued at $16,877,309 was exported in 1961 compared with 19,355,248 gallons valued at $5,476,518 imported. Exports were a significant factor in the marketing of benzene in 1961 and accounted for approximately 9 percent of the total national output.

Prices on most of the light-oil derivatives, with the exception of benzene, did not vary to any large extent from 1960 prices. Benzene prices did decline, and the 3-cent-per-gallon cut in July reduced the average price per gallon, f.o.b. works, received by coke-plant operators, from $0.321 in 1960 to $0.307 in 1961.

TABLE 58.—Estimated supply of specification grades of benzene (excluding Motor grade) in the United States

(Thousand gallons)

	1950–54 (average)	1957–59 (average)	1960	1961
Production from domestic crude materials:				
By coke ovens[1]	159,892	139,121	135,326	120,205
By tar distillers[2]	17,500	10,667	12,787	12,355
By petroleum refiners[3]	46,635	155,694	309,210	412,819
Total	224,027	305,482	457,323	545,379
Imports (pure benzene equivalent)[4]	32,042	50,501	36,215	18,387
Total supply	256,069	355,983	493,538	563.766

[1] Federal Bureau of Mines.

[2] Estimated.

[3] U.S. Tariff Commission.

[4] Official import statistics published by the Bureau of the Census, U.S. Department of Commerce, do not differentiate between crude and pure benzene. Pure benzene equivalent of imports estimated at 95 percent.

TABLE 59.—Estimated consumption of commercial benzene (excluding Motor grade) in the United States, by uses[1]

(Thousand gallons)

Use	1957–59 (average)	1960	1961
Styrene	160,000	210,000	210,000
Phenol (synthetic)	74,000	100,000	100,000
Dodecyl Benzene	36,000	37,000	36,000
Cyclohexane	30,000	40,000	50,000
Aniline	14,000	15,000	16,000
DDT	14,000	16,000	16,000
Di- and Mono-Chlorobenzene	11,000	15,000	15,000
Maleic Anhydride	9,000	17,000	13,000
Benzene Hexachloride	3,000	3,000	2,000
Di-Phenyls	4,500	4,500	5,000
Nitrobenzene	2,000	2,000	2,000
Miscellaneous	21.500	9,000	9,000
Exported	7,000	23,500	46,000
Total	386,000	492,000	520,000

[1] Coal-Chemicals Committee, American Coke and Coal-Chemicals Institute, Washington, D.C.

Fuel Briquets and Packaged Fuel

By Eugene T. Sheridan[1] and Virginia C. Berté[2]

⁂

Contents

	Page		Page
General summary	265	Fuel briquets—Continued	
Scope of report	267	Technology	275
Fuel briquets	268	Packaged fuel	276
Capacity	268	Capacity	276
Production	269	Production	277
Raw materials	270	Raw materials	278
Shipments	271	Shipments	279
Value and price	273	Value and price	280
Foreign trade	273	World review	280

GENERAL SUMMARY

PRODUCTION of both fuel briquets and packaged fuel in the United States continued to decline in 1961, and output of each fuel was nearly one-fourth less than in 1960. These decreases continued the steady downward trend in production that began shortly after World War II. The largest output of briquets was in 1947, when production reached 3.2 million tons; packaged-fuel production was greatest in 1940, when 285,000 tons was produced.

Twelve briquet plants with a total maximum annual productive capacity of 2.3 million tons produced only 572,000 tons because all plants operated at reduced rates. Sixteen packaged-fuel plants with a total capacity of 114,000 tons produced only 19,000 tons of packaged fuel.

Wisconsin was the chief briquet producer, and Michigan was the main supplier of packaged fuel; these States furnished 45 and 53 percent of the total output of each fuel, respectively.

More than two-thirds of the briquets and nearly all packaged fuel were manufactured from low-volatile bituminous coal. Binders were starch, asphalt, and coal-tar pitch. Asphalt was the chief briquet binder, and starch was the preferred packaged-fuel binder.

Total value of production was $8 million for briquets and $446,000 for packaged fuel; prices remained stable in 1961.

Foreign trade was insignificant; only 13,000 tons of briquets was exported, and 7,000 tons was imported. There was no foreign trade in packaged fuel.

---

[1] Supervisory commodity-industry analyst.

[2] Statistical clerk.

TABLE 1.—Salient fuel-briquetting and packaged-fuel statistics

	1957–59 (average)	1960	1961
Fuel briquets:			
United States:			
Production ... short tons	1,002,054	744,385	572,264
Value	$14,841,840	$10,429,809	$8,023,169
Average per ton, f.o.b. plant	$14.81	$14.01	$14.02
Imports [1] ... short tons	406	6,676	7,338
Exports [1] ... do	58,294	21,126	12,731
Consumption [2] ... do	944,166	729,935	566,871
World production ... do	[3] 117,800,000	[3] 118,700,000	121,300,000
Packaged fuel:			
United States:			
Production ... short tons	38,923	24,706	19,180
Value	$880,388	$579,217	$445,740
Average per ton, f.o.b. plant	$22.62	$23.44	$23.24

[1] Compiled from records of the U.S. Department of Commerce. Excludes exports of briquets made from petroleum coke and residual carbon from manufacturing oil gas.

[2] Production plus imports minus exports. Import and export data do not include briquets made from petroleum products.

[3] Revised figure.

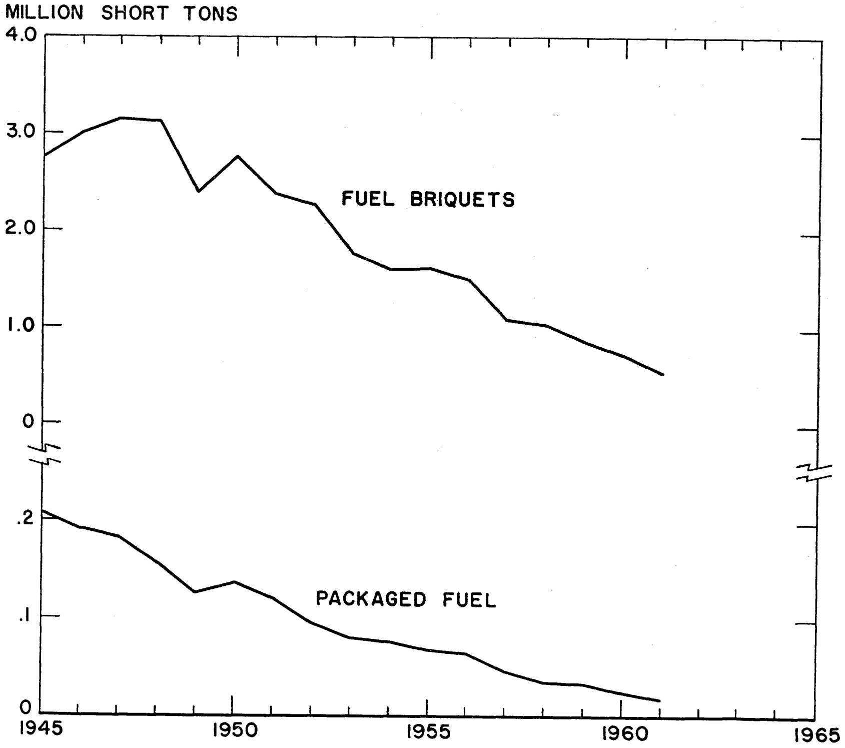

FIGURE 1.—Production of fuel briquets and packaged fuel in the United States, 1945–61.

SCOPE OF REPORT

This report, part of an annual publication of the Bureau of Mines, is based upon data submitted voluntarily by the fuel-briquet and packaged-fuel producers in the United States. Similar reports on the fuel-briquet industry have been published each year since 1907, except in 1910 when no data were collected. A report on the packaged-fuel industry has been published annually since 1935.

All data, except where noted, were compiled from producers' reports. Included, however, were reports of processed fuels of mineral origin only. Specifically excluded from the data were briquets made from wood and nutshell charcoal, as these materials are forest products and are not included in the Bureau's commodity programs.

Complete coverage of both industries was attempted, and as far as could be determined, all known producers were canvassed. Of the 16 briquet plants to which survey forms were mailed, 12 reported production; 1 was idle; 1 was abandoned; and 2 did not reply. The idle plant was an experimental plant that previously had not reported production; the abandoned plant had not operated since June 1960; and the plants that did not reply reported very little production in 1960 and were presumed idle or abandoned in 1961. Twenty-eight plants were canvassed for packaged-fuel production. Of this number, 16 reported production; 3 were idle; 2 were abandoned; and 7 did not reply. Of the plants that did not respond to our survey, only three reported production in the preceding year.

Although briquets and packaged fuel are similar, the industries are considered separately because the fuels have different properties and are used for different purposes. Briquets are compressed, solid-fuel fines, produced as pillow-shaped forms, 2 to 4 inches long. They are made with a water-insoluble binder and are handled and used as bulk fuel, chiefly for cooking and household heating. Briquet plants are relatively large and usually are at mines or coal-unloading docks where fine-sized coals accumulate. Packaged fuel also is made from fine-sized fuels, but these are compressed into 3- or 4-inch cubes, six or eight of which are wrapped together in heavy craft paper to form a package weighing from 10 to 15 pounds. Packaged fuel is used for residential heating also, but it is a specialty fuel, used mostly as a supplement in some areas in the months preceding and following the heating season. Unlike fuel-briquet plants, most packaged-fuel plants are small and are used chiefly to salvage the fines that accumulate in fuel yards. A few are relatively large, however, and manufacture the bulk of their output from raw fuel obtained from other sources.

The average of the 3-year period, 1957–59, was used as a base for measuring production and consumption trends. All quantities were shown in short tons, and the values assigned to production were based upon the average sales values, f.o.b. plant, reported by producers.

Data on briquet production and shipments were shown by geographic regions, arbitrarily established, rather than by States, to avoid revealing individual plant data in States with a small number of producing companies. States assigned to each region were as follows: Eastern—West Virginia; Central—Indiana, Michigan, and Wisconsin; Western—Missouri and North Dakota.

No data were collected on stocks, as briquets and packaged fuel generally are produced and sold on a seasonal basis. The small difference in briquet production and sales was due chiefly to the excess production of one plant.

The term "capacity" in this report refers to the total maximum quantity of fuel briquets and packaged fuel that each industry could produce if all active plants operated their regular number of hours, or shifts, per day and allowed for unavoidable shutdowns. The capacities shown include only the plants that reported production for 1961. These plants, however, furnished virtually the entire capacity of the industries.

The terms "consumption" and "distribution" were used synonymously as it was assumed that the fuels were used in the States to which they were shipped by producers.

FUEL BRIQUETS

CAPACITY

Productive capacity of the industry was about 10 percent lower than in 1960 because there were two less operating plants. All other plants maintained the same capacity as in the preceding year, although all reported lower production. Plant capacities ranged from 45,000 to 600,000 tons per year. About three-fifths of the plants, however, had capacities of 100,000 tons or less. The total capacity of the industry greatly exceeded production as output was less than 25 percent of the amount the industry was capable of producing. Table 2 shows the annual productive capacity and rate of operation of the briquet industry from 1957 through 1961.

TABLE 2.—Annual capacity and production of briquetting plants in the United States

	Active plants	Annual capacity (short tons)	Production	
			Short tons	Percent of capacity
1957	17	3,088,000	1,104,781	35.8
1958	16	3,018,000	1,035,261	34.3
1959	15	2,955,500	866,120	29.3
1960	14	2,624,500	744,385	28.4
1961:				
Plants with capacity of—				
Less than 25,000 tons	---	---	---	---
25,000 to less than 100,000 tons	4	197,000	49,036	24.9
100,000 to less than 200,000 tons	4	647,500	198,627	30.7
200,000 to less than 400,000 tons	1	(1)	(1)	(1)
400,000 or more tons	3	1,500,000	324,601	21.6
Total	12	2,344,500	572,264	24.4
Plants with production of—				
Less than 5,000 tons	---	---	---	---
5,000 to less than 10,000 tons	1	(2)	(2)	(2)
10,000 to less than 25,000 tons	5	397,000	87,994	22.2
25,000 to less than 100,000 tons	5	1,947,500	484,270	24.9
100,000 or more tons	1	(3)	(3)	(3)
Total	12	2,344,500	572,264	24.4

[1] Combined with "100,000 to less than 200,000 tons" to avoid disclosing individual company figures.
[2] Combined with "10,000 to less than 25,000 tons" to avoid disclosing individual company figures.
[3] Combined with "25,000 to less than 100,000 tons" to avoid disclosing individual company figures.

PRODUCTION

Production in 1961 decreased 23 percent because there were two less operating plants and because there was less output from all active plants than in the preceding year. The decrease continued a trend of declining production for the industry that began in 1948 owing to increasing use of natural gas and fuel oil for residential heating. Since then competition from these fuels has increased steadily, and current output is only about one-sixth as large as in 1947, the year of peak production. Relative to the base years production decreased 43 percent.

Twelve plants in six States reported briquet production. Three-fourths of the total, however, was produced in West Virginia and Wisconsin. Wisconsin, with six plants, had the greatest number of active operations and also the largest output. All plants in Wisconsin were in the northern and Lake Dock areas. West Virginia had one plant in McDowell county in the southwest mining district. Other producing States and the number of operating plants, in order of output, were Michigan, one; Missouri, two; North Dakota, one; and Indiana, one. The briquet plant at Fort Smith, Ark., that had produced briquets from semianthracite since 1948 did not respond and was presumed to have been abandoned.

Table 3 shows briquet production and value and the number of active operations. Production was shown by regions rather than States because all States but Wisconsin had less than three producers.

Because briquets are used chiefly for space heating and sold as produced, production varied with the season, ranging from 86,000 tons in January to 14,000 tons in July. The quantity produced in each month in 1961 is shown in table 4.

TABLE 3.—Production and value of fuel briquets in the United States, by regions

Region	1960				1961			
	Active plants	Production (short tons)	Value		Active plants	Production (short tons)	Value	
			Total	Average			Total	Average
Eastern States	2	(1)	(1)	(1)	1	(1)	(1)	(1)
Central States	8	636,986	$8,843,665	$13.88	8	325,801	$5,128,459	$15.74
Western States	4	107,399	1,586,144	14.77	3	246,463	2,894,710	11.75
Total	14	744,385	10,429,809	14.01	12	572,264	8,023,169	14.02

[1] Included with "Western States" to avoid disclosing individual company figures.

TABLE 4.—Production of fuel briquets in the United States in 1961, by months

Month	Short tons	Month	Short tons	Month	Short tons
January	85,714	May	31,786	September	49,064
February	56,039	June	34,987	October	84,120
March	19,174	July	13,639	November	77,464
April	20,280	August	23,341	December	76,656

RAW MATERIALS

Raw Fuels.—Briquets were manufactured from seven different fuels. Two-thirds of the total raw fuels used, however, was low-volatile bituminous coal. Petroleum coke supplied 21 percent, and Pennsylvania anthracite was 5 percent of the total. Other fuels, in order of quantities consumed, were high-volatile bituminous coal, lignite char, semianthracite, and Arkansas anthracite. Approximately one-fifth of the total raw fuels originated from screenings in coal yards; most of the remainder was supplied by mines and unloading docks. All but five plants used more than one type of fuel. In most instances, those using several types combined the different fuels to produce a composite briquet.

The average value per ton for raw fuels at the plant before processing was $8.81. This was about seven-eighths the average unit value of total materials.

Binders.—All but one plant used petroleum asphalt exclusively as a binding material. This plant used a mixture of petroleum asphalt and coal-tar pitch, combined in the ratio of approximately 1:1. Asphalt was preferred because of its good cohesive properties, insolubility in water, low-ash content, and relatively low cost. Excluding water, binders usually constitute 6 to 8 percent of the total raw materials; in 1961 an average of 148 pounds of binder was used for each ton of raw fuel. In addition to binders, two plants used a small quantity of oil that was sprayed on the finished briquet for dustproofing. The average value per ton of the binding materials (including spray oil) consumed in 1961 was $27.26. On the basis of value per unit of production, the value of the binder used for each ton of briquets was $1.91. This was about one-fifth the value of the total raw materials used for producing each ton of briquets.

TABLE 5.—Raw fuels used in making fuel briquets in the United States in 1961

Type	Number of plants	Used		
		Short tons	Value	
			Total	Average
Anthracite:				
Pennsylvania	3	28,403	$290,452	$10.23
Other than Pennsylvania	1	(1)	(1)	(1)
Semianthracite	1	(1)	(1)	(1)
Bituminous coal:				
Low-volatile	10	360,498	3,188,168	8.84
High-volatile	2	(1)	(1)	(1)
Petroleum coke	7	112,196	966,725	8.62
Lignite char	1	(1)	(1)	(1)
Undistributed		39,075	312,600	8.00
Total	[2] 12	540,172	4,757,945	8.81

[1] Included with "Undistributed" to avoid disclosing individual company figures.

[2] Some plants used more than 1 type of raw fuel; hence, the number of plants exceeds the total shown.

TABLE 6.—Quantity and value of raw materials used in making fuel briquets in the United States and quantity and value of sales in 1961, by regions

Region	Raw materials used					
	Fuels			Binders[1]		
	Short tons	Value		Short tons	Value	
		Total	Average		Total	Average
Eastern States	(2)	(2)	(2)	(2)	(2)	(2)
Central States	311,805	$3,260,287	$10.46	21,535	$572,903	$26.60
Western States	228,367	1,497,658	6.56	18,554	520,104	28.03
Total	540,172	4,757,945	8.81	40,089	1,093,007	27.26

Region	Total raw materials			Fuel briquets sold		
	Short tons	Value		Short tons	Value	
		Total	Average		Total	Average
Eastern States	(2)	(2)	(2)	(2)	(2)	(2)
Central States	333,340	$3,833,190	$11.50	325,619	$5,123,096	$15.73
Western States	246,921	2,017,762	8.17	240,753	2,810,406	11.67
Total	580,261	5,850,952	10.08	566,372	7,933,502	14.01

[1] Includes 395 tons of spray oil used by 2 plants for dustproofing briquets.

[2] Included with "Western States" to avoid disclosing individual company figures.

SHIPMENTS

Briquets were distributed in 26 States and exported to 10 foreign countries. The quantities consumed in individual States varied extensively, however, ranging from 1 ton in Montana to 111,000 tons in Wisconsin.

Wisconsin, the chief producing State, was also the principal consumer of briquets, using about one-fifth of the total distributed. Wisconsin consumed about one-half of its production, shipping the remainder to eight other States and Canada. West Virginia, ranking second as a producer, shipped virtually all production to 18 other States and Canada; Indiana, Michigan, North Carolina, Ohio, and Virginia were the chief consumers, receiving, collectively, about five-sixths of the total shipments.

Michigan ranked second in consumption, utilizing about 15 percent of all briquets distributed. Minnesota, Indiana, and Missouri followed, receiving, 12, 9, and 8 percent, respectively, of the total shipments. Minnesota was the largest nonproducing consumer. Except for Indiana, the other States produced most of the briquets they consumed.

About three-fourths of the shipments were by rail, about the same percentage as in 1960. The type of transportation varied somewhat with the producing region, however. In the Eastern region virtually all shipments were by rail because most markets were too distant for practical delivery by truck. In the Central and Western regions about twice as many briquets were shipped by rail as by truck.

Only 7,000 tons was exported by producers, all to Canada. In addition to this quantity, however, data collected by the Bureau of the Census revealed that approximately 6,000 additional tons was shipped to foreign countries by export firms.

Except for a few hundred tons packaged in bags and cartons, all briquets were shipped and sold in bulk. Shipments by State of origin were not shown because of the small number of producing companies.

Tables 7 and 8 show destination of shipments and mode of transportation.

TABLE 7.—Destination of shipments of fuel briquets [1]

(Short tons)

Destination	1960	1961	Destination	1960	1961
Arkansas	821	----------	North Carolina	22,929	22,388
California	120	----------	North Dakota	39,217	30,837
Connecticut	45	----------	Ohio	42,173	33,417
Florida	101	50	Pennsylvania	299	319
Illinois	30,224	22,775	South Carolina	1,978	700
Indiana	61,012	48,806	South Dakota	33,586	25,455
Iowa	25,305	18,618	Tennessee	689	677
Kansas	7,053	2,512	Vermont	48	----------
Kentucky	3,018	2,618	Virginia	36,729	29,942
Maine	145	51	Washington	1,204	937
Maryland	1,262	954	West Virginia	882	333
Massachusetts	505	265	Wisconsin	148,989	111,192
Michigan	106,639	87,160			
Minnesota	87,089	68,729	Total	731,192	559,210
Missouri	72,952	46,533	Exported	13,201	7,162
Montana	39	1			
Nebraska	6,089	3,890	Grand total	744,393	566,372
New Hampshire	50	51			

[1] Based upon reports from producers showing destination of briquets used or sold.

TABLE 8.—Shipments of fuel briquets in the United States, by methods of transportation [1]

(Short tons)

Origin	1960			1961		
	Rail	Truck	Total	Rail	Truck	Total
Eastern States	(2)	(2)	(2)	(2)	(2)	(2)
Central States	283,959	122,856	406,815	224,432	101,187	325,619
Western States	265,379	72,199	337,578	195,156	45,597	240,753
Total	549,338	195,055	[3] 744,393	419,588	146,784	[3] 566,372

[1] Includes shipments destined for export as reported by producers directly to the Bureau of Mines.
[2] Included with "Western States" to avoid disclosing individual company figures.
[3] An additional 541 tons in 1960 and 1,407 tons in 1961 was used as fuel by producers.

VALUE AND PRICE

The total value of briquet production was $8 million. This was determined by applying the average sales value per ton, f.o.b. plant, as reported by producers, to total production. As virtually all briquets produced were also sold, this figure represents a reasonable measurement of the worth of the industry output.

The average value per ton, f.o.b. plant, for all briquets sold was $14.01. Average unit values ranged, however, from $11.67 for plants in the Eastern and Western States to $15.73 for plants in the Central States. Briquets made in the Eastern region had the lowest unit value because they were produced at the source of the raw fuel. In most instances, however, these briquets were shipped farther than those produced in other regions, and the additional costs for transportation added substantially to the selling price at the point of consumption. Briquets made from fuels remote from the producing area had higher plant values because transportation charges were reflected in the values of the raw fuels consumed. These briquets, however, generally were sold near the producing area and were competitively priced with briquets shipped from areas having low plant values but comparable delivered values after the cost of transportation was added to the value of the finished product.

FOREIGN TRADE

Foreign trade was small; only 13,000 tons (2 percent of the production) was exported, and 7,000 tons was imported.

Exports continued to decline and less than one-fourth the quantity of briquets was exported than in the base years. Canada remained the principal export market, receiving about seven-eighths of the foreign shipments. Most of these were delivered through the Duluth and Superior, Dakota, and Michigan customs districts. Mexico received 10 percent of the total, and the remaining 3 percent was shipped to eight other countries.

Imports increased 33 percent from 1960 and were about 18 times greater than the base years. Of 7,000 tons imported, all but 3 percent was shipped from Canada. The remainder was imported from Japan and the United Kingdom.

Data on exports and imports shown in tables 9 and 10 were compiled from records of the U.S. Department of Commerce. The export data differ from those reported by producers to the Bureau of Mines and shown in table 7 because shipments made by export firms are included. They do not include, however, briquets made from petroleum coke, which are included in the data in table 7.

The unit value of imported briquets was nearly four times greater than that of domestic briquets; however, the values are not comparable as they were assigned at different marketing levels. Also, most of the imported briquets were in small packages, whereas domestic briquets were shipped in bulk and sold by the ton.

TABLE 9.—Fuel briquets (coal and coke) exported from the United States, by countries of destination and customs districts

	1959		1960		1961	
	Short tons	Value	Short tons	Value	Short tons	Value
COUNTRY						
North America:						
British Honduras	100	$2,550	---------	---------	19	$266
Canada	33,358	492,728	19,403	$279,458	11,063	152,791
Canal Zone	---------	---------	---------	---------	14	202
Dominican Republic	---------	---------	---------	---------	111	1,574
Mexico	---------	---------	244	2,916	1,248	17,327
Trinidad and Tobago	---------	---------	457	7,240	---------	---------
Total	33,458	495,278	20,104	289,614	12,455	172,160
South America:						
Surinam	---------	---------	---------	---------	55	816
Venezuela	---------	---------	10	1,255	111	1,317
Total	---------	---------	10	1,255	166	2,133
Asia:						
Indonesia	---------	---------	---------	---------	24	348
Japan	---------	---------	393	5,291	---------	---------
Pakistan	---------	---------	258	3,281	---------	---------
Saudi Arabia	---------	---------	---------	---------	67	945
Thailand	---------	---------	20	450	---------	---------
Total	---------	---------	671	9,022	91	1,293
Africa:						
Congo, Republic of the and Ruanda-Urundi [1]	---------	---------	341	5,524	---------	---------
Liberia	---------	---------	---------	---------	19	280
Total	---------	---------	341	5,524	19	280
Grand total	33,458	495,278	21,126	305,415	12,731	175,866
CUSTOMS DISTRICT						
Arizona	---------	---------	68	1,026	---------	---------
Buffalo	1,825	31,357	2,078	29,686	946	14,614
Dakota	12,770	174,903	6,680	103,175	2,883	40,777
Duluth and Superior	9,023	141,056	5,177	81,395	3,480	53,981
Galveston	---------	---------	278	3,731	187	2,440
Laredo	---------	---------	172	1,650	986	13,893
Michigan	5,979	77,707	5,418	64,610	2,770	31,944
Minnesota	50	806	---------	---------	---------	---------
Mobile	---------	---------	---------	---------	71	1,004
Montana and Idaho	---------	---------	---------	---------	127	1,800
New Orleans	---------	---------	10	1,255	73	1,038
New York	---------	---------	341	5,524	210	3,046
Ohio	892	12,211	---------	---------	---------	---------
St. Lawrence	2,429	49,898	---------	---------	724	7,790
San Diego	---------	---------	4	240	141	1,654
San Francisco	---------	---------	393	5,291	---------	---------
Vermont	---------	---------	50	592	---------	---------
Virginia	---------	---------	457	7,240	---------	---------
Washington	---------	---------	---------	---------	133	1,885
Other	[2] 490	[2] 7,340	---------	---------	---------	---------
Total	33,458	495,278	21,126	305,415	12,731	175,866

[1] Belgian Congo before July 1, 1960.
[2] Estimated from sample data; district data not available.

Source: Bureau of the Census.

TABLE 10.—Fuel briquets (coal and coke) imported, by countries and customs districts

Country and customs district	1959		1960		1961	
	Short tons	Value	Short tons	Value	Short tons	Value
Canada:						
Buffalo	----------	----------	(1)	(1)	1,821	$91,877
Dakota	----------	----------	1,735	$170,102	921	48,014
Duluth and Superior	----------	----------	----------	----------	187	9,341
Hawaii	----------	----------	----------	----------	96	3,427
Michigan	----------	----------	[2] 3	[2] 421	500	26,278
Montana and Idaho	----------	----------	1,533	41,348	1,477	73,758
Washington	179	$2,162	1,249	113,615	2,100	104,192
Total	179	2,162	[2] 4,520	[2] 325,486	7,102	356,887
Japan:						
Hawaii	----------	----------	----------	----------	25	1,543
Los Angeles	----------	----------	410	22,313	135	7,259
New York	----------	----------	7	36	(3)	18
San Francisco	----------	----------	591	26,396	20	982
Washington	----------	----------	----------	----------	50	2,830
Total	----------	----------	1,008	48,745	230	12,632
Netherlands: Chicago	----------	----------	1	331	----------	----------
United Kingdom:						
Los Angeles	----------	----------	----------	----------	6	466
Maryland	6	437	----------	----------	----------	----------
Total	6	437	----------	----------	6	466
Grand total	185	2,599	[2] 5,529	[2] 374,562	7,338	369,985

[1] Revised to none.
[2] Revised figure.
[3] Less than 1 ton.

Source: Bureau of the Census.

TECHNOLOGY

Two new types of continuous briquet dryers of so-called radical design have been developed by the Briquette Processing Equipment Corporation of St. Louis, Mo. Both use high-velocity heated air to dry briquets, and both operate on the principle of convection-heat transfer from a gas to a solid. One dryer, however, uses a conventional horizontal wire belt with heated air at high velocity flowing downward through the bed of briquets; the other uses high-velocity heated air rising vertically in counterflow to a slow-settling bed of briquets in a vertical cylinder. In conventional dryers, the transfer of heat to a briquet by normal convection heating is resisted by a thin stagnant film of gas on the briquet surface. These new dryers, however, disperse this film with high-velocity heated air that produces an extreme turbulence of heated air on the surface of the briquets. Also, the multiple changes in direction of the airflow through the bed of briquets is thought to produce a partial vacuum on parts of the briquet surface, thereby permitting a more rapid travel of moisture to the surface of the briquet, subsequently hastening drying. In addition to providing the means for heat transfer, the high-velocity airflow used in these dryers also provides for entraining and removing the fines, continuously and automatically, from the bed of briquets. This procedure reduces maintenance requirements and virtually eliminates the conditions that cause fire and dust explosion. The design and principles of operation of these dryers were described in more detail in a paper [3] presented at the 7th Biennial Conference of the International Briquetting Association.

Another paper [4] presented at the Conference reviewed the potential values in using spent sulfite liquor products as binders for briquets. Sulfite waste liquor is a material produced at pulp mills that use the sulfite pulping process to produce chemical pulps for paper, rayon, cellulose tape, and related industries. As the name implies, this material is the liquid that remains after sulfite acid liquor acts upon wood, and although of no further use in the pulping process, it contains valuable chemical compounds that are used for manufacturing other products. Some of the more important products are adhesives, emulsifiers, tanning agents, and binding materials.

Although the binding applications of spent sulfite liquor have been confined chiefly to roadbuilding, many attempts have been made to use it as a binder for fuel briquets because it is relatively inexpensive compared with other briquet binders. Its use has been generally unsatisfactory, however, because of its inability to provide waterproof briquets with acceptable green strength.

Recent research has shown that the binding and weathering properties of sulfite liquor can be improved by processing the liquor after the pulping process is completed. Strength properties of briquets were improved by polymerization of the lignosulfonates in the liquor, and compressive strength increased as the molecular weight increased. There appeared to be an optimum molecular weight for each type of material briquetted, however. Polymerization also increased the water resistance properties of spent liquor binder. The results of these tests were not conclusive, however, and further study is continuing in these areas.

PACKAGED FUEL

CAPACITY

Productive capacity of the packaged-fuel industry decreased 7 percent in 1961, chiefly because there were three less operating plants. All but two plants maintained the same capacity as in the preceding year. Of these, one reported a small increase and the other a decrease. As with briquets, this industry has declined steadily in the past decade and is now less than one-third as large as in 1952, the year before the start of the current decline. During the period, 1952–61, capacity decreased 245,000 tons, and operating plants, decreased from 43 to 16. This industry had more plants than the briquet industry but was less than one-twentieth the size, having an annual productive capacity in 1961 of only 114,000 tons. Most of the plants are small; 12 had capacities of less than 5,000 tons, and only 1 was capable of producing more than 25,000 tons. Nearly three-fourths of the total capacity was in three of the active plants.

---

[3] Bernhard, Frank C. High Velocity Drying of Briquets. Paper pres. at 7th Biennial Conf. Internat. Briquetting Assoc., Jackson, Wyo., August 1961.

[4] Lueck, B. F., H. S. Olson, and A. J. Wiley. Modified Spent Sulfite Liquor as Binders and Adhesives for Briquets and Other Products. Paper pres. at 7th Biennial Conf. Internat. Briquetting Assoc., Jackson, Wyo., August 1961.

Annual capacity and production of the active plants in 1961 are shown in table 11.

TABLE 11.—Annual capacity and production of packaged-fuel plants in the United States

	Active plants	Annual capacity (short tons)	Production	
			Short tons	Percent of capacity
1957	23	150,200	47,287	31.5
1958	23	141,800	35,769	25.2
1959	21	138,100	33,715	24.4
1960	19	123,000	24,706	20.1
1961:				
Plants with capacity of—				
Less than 5,000 tons	12	24,500	3,110	12.7
5,000 to less than 10,000 tons	1	[1] 89,800	16,070	17.9
10,000 to less than 15,000 tons	1			
15,000 to less than 25,000 tons	1			
25,000 or more tons	1			
Total	16	114,300	19,180	16.8
Plants with production of—				
Less than 1,000 tons	13	32,300	3,520	10.9
1,000 to less than 3,000 tons	1	[1] 82,000	15,660	19.1
3,000 to less than 5,000 tons	1			
5,000 to less than 10,000 tons	1			
Total	16	114,300	19,180	16.8

[1] Combined to avoid disclosing individual company figures.

PRODUCTION

Output of the industry decreased 22 percent from the preceding year, partly because there were three less operating plants. However, all but three of the active plants had less production than in 1960; these plants had only modest increases. Total output was about one-half as large as in the base years.

Production rates also declined; the industry produced only about one-sixth the quantity of packaged fuel that it was capable of producing. The average rate of operation of the industry was 16.8 percent, 3.3 percentage points lower than in 1960.

Sixteen producers in seven States reported output; Michigan led with 53 percent of the total. Indiana and Wisconsin produced most of the remainder. Michigan and Ohio had the greatest number of operations; most of the plants in these States were small, however. Data on production in various States are shown in table 12.

Production was seasonal, ranging from 3,117 tons in January to 61 tons in June. Virtually all packaged fuel produced in 1961 was sold in the same year.

Production was slightly less than the combined total of fuels and binders because of breakage and other minor losses.

TABLE 12.—Production and value of packaged fuel in the United States, by States

State	1960				1961			
	Active plants	Production (short tons)	Value		Active plants	Production (short tons)	Value	
			Total	Average			Total	Average
Indiana	3	4,063	$89,386	$22.00	3	3,015	$69,130	$22.93
Michigan	5	12,256	294,743	24.05	4	10,077	245,127	24.33
Ohio	5	1,293	28,066	21.71	5	1,491	32,771	21.98
Other States	[1] 6	7,094	167,022	23.54	[2] 4	4,597	98,712	21.47
Total	19	24,706	579,217	23.44	16	19,180	445,740	23.24

[1] Comprises 2 plants each in Minnesota and Virginia and 1 plant each in Illinois and Wisconsin.
[2] Comprises 1 plant each in Illinois, Minnesota, Virginia, and Wisconsin.

TABLE 13.—Production of packaged fuel in the United States in 1961, by months

Month	Short tons	Month	Short tons	Month	Short tons
January	3,117	May	1,028	September	824
February	2,380	June	61	October	2,070
March	2,103	July	226	November	2,251
April	1,492	August	1,222	December	2,406

RAW MATERIALS

Raw Fuels.—Virtually all packaged fuel was manufactured from low-volatile bituminous coal. One plant, however, used a small quantity of petroleum coke and high-volatile bituminous coal in addition to low-volatile bituminous coal. Thirteen percent of the raw fuels was yard screenings that had accumulated in coalyards; the remainder was purchased from other sources, chiefly from docks and other points where coal was unloaded. Eight plants used yard screenings exclusively; five, fuel from other sources; and three, both types. Most of the small plants confined their output to available yard screenings, whereas the larger plants obtained most of their raw fuel from other sources.

The average value of raw fuels consumed was $9.83 per ton, about 93 percent of the cost per ton for all raw materials.

Binders.—Starch was used exclusively as a binder by 14 of the 16 active plants; one plant used petroleum asphalt, and another used a mixture of starch and asphalt. Starch was preferred because only small quantities were required, and binder cost per ton of production was relatively low. Exact figures on starch binder could not be shown but the plants that used starch, exclusively, consumed approximately 15 pounds of starch, worth about $0.90, for each ton of packaged fuel produced.

The average value per ton for all binders consumed was $44.40. Binders consumed in Indiana and Ohio averaged $103 and $127 per ton, respectively. Plants in these States, however, used only starch, approximately four times more expensive than asphalt. The values shown for Michigan and other States were substantially lower because of the asphalt consumed.

The quantity and value of raw materials consumed as well as data on sales are shown in table 14.

TABLE 14.—**Quantity and value of raw materials used in making packaged fuel in the United States and quantity and value of sales in 1961, by States**

State	Raw materials used					
	Fuels			Binders		
	Short tons	Value		Short tons	Value	
		Total	Average		Total	Average
Indiana	3,015	$33,766	$11.20	17	$1,750	$102.94
Michigan	10,076	95,430	9.47	75	5,614	74.85
Ohio	1,489	16,672	11.20	14	1,783	127.36
Other States[1]	4,418	40,914	9.26	300	8,881	29.60
Total	18,998	186,782	9.83	406	18,028	44.40

State	Total raw materials			Packaged fuel sold		
	Short tons	Value		Short tons	Value	
		Total	Average		Total	Average
Indiana	3,032	$35,516	$11.71	3,015	$69,130	$22.93
Michigan	10,151	101,044	9.95	9,902	240,884	24.33
Ohio	1,503	18,455	12.28	1,491	32,771	21.98
Other States[1]	4,718	49,795	10.55	4,597	98,712	21.47
Total	19,404	204,810	10.56	19,005	441,497	23.23

[1] Comprises 1 plant each in Illinois, Minnesota, Virginia, and Wisconsin.

SHIPMENTS

All producers except one sold packaged fuel locally. Quantities could not be shown, but most packaged fuel was sold in the area where it was produced. Of the quantity sold locally, about one-third was sold at the plant. Demand kept pace with production, and less than 1 percent of the output was undistributed. Only one plant produced more packaged fuel than it sold. All shipments were by truck; no packaged fuel has been shipped by rail since 1953. Data on shipments in the past 5 years are shown in table 15.

TABLE 15.—**Shipments of packaged fuel in the United States, by methods of transportation**

(Short tons)

Year	Shipped by truck		
	Local sales	Other than local sales	Total
1957	39,739	7,475	47,214
1958	36,862	(1)	36,862
1959	31,219	(1)	31,219
1960	24,940	(1)	24,940
1961	19,005	(1)	19,005

[1] Combined with "Local sales" to avoid disclosing individual company figures.

VALUE AND PRICE

The total value of production, calculated from the reported f.o.b. plant value of commercial sales, was approximately one-half million dollars. This was 23 percent less than in 1960, but the decrease was directly proportionate to declining production as average unit values remained virtually the same. Relative to the base years, average unit values were slightly higher in 1961.

Packaged fuel had an average f.o.b. plant value of $23.23 per ton. This was considerably more than the average plant value of fuel briquets, but the values are not comparable because the products are different and are marketed differently. Because most briquets were sold in bulk for residential heating, their prices were competitive with prices of other bulk solid fuels. Also, most were sold through wholesale and retail channels, and the actual price to the consumer was substantially greater than the f.o.b. plant value. In contrast, packaged fuel is a specialty item, sold chiefly in small quantities directly to consumers. The f.o.b. plant value was, therefore, approximately equal to the retail price.

Packaged fuel produced in Minnesota had the highest unit value; that produced in Wisconsin had the lowest.

WORLD REVIEW

The quantity of fuel briquets and other processed solid fuels of mineral origin produced throughout the world in 1961 was estimated at 121 million short tons. This was 2 percent more than in 1960; the increase is attributed chiefly to a larger output of lignite briquets in East Germany.

Ninety-three percent of the total output was produced in Europe, principally from lignite, although bituminous coal, anthracite, and peat were used also. East Germany, the largest producer, manufactured more than half of the world total, all from lignite. West Germany ranked second with 19 percent. These also were made principally from lignite, but about one-fourth was manufactured from anthracite and bituminous coal. Briquets in both countries were used extensively to supplement supplies of other fuels in industrial plants and for residential heating.

The Soviet Union had 8 percent of the world production, the same as 1960. No data were available on the raw fuels briquetted in that country, but it was estimated that approximately one-third of the output was manufactured from peat.

Briquets were produced also in 18 other European countries, and their combined output was 14 percent of the world total although production in most of these countries was small. Only seven countries—Belgium, France, Hungary, Netherlands, Poland, Spain, and the United Kingdom—produced more than 1 million tons.

Of six Asiatic countries that produced briquets, Japan and Korea had 96 percent of the output. The combined production of these two countries was 5 percent of the world total. Other producing countries in Asia were Indonesia, Pakistan, Turkey, and South Viet-Nam.

Australia, with 2 million tons, produced 2 percent of all briquets. The remaining 1 percent was made in Algeria, Canada, Morocco, New Zealand, Peru, Tunisia, and the United States. The United States had 0.5 percent of the total world production and ranked 15th in output.

TABLE 16.—World production of fuel briquets and packaged fuel, by countries [1]

(Thousand short tons)

Country	1957	1958	1959	1960	1961
North America:					
Canada	395	204	153	81	67
United States:					
Briquets	1,105	1,035	866	744	572
Packaged fuel	47	36	34	25	19
Total	1,547	1,275	1,053	850	658
South America: Peru	18	9	4	[2] 6	[2] 6
Europe:					
Austria	13	2	---------	---------	---------
Belgium	2,023	1,143	1,105	1,189	1,240
Bulgaria [2]	255	275	275	275	275
Czechoslovakia:					
Bituminous	365	433	417	360	[2] 370
Lignite	342	365	362	481	[2] 500
Denmark	96	83	49	50	[2] 50
Finland	10	11	10	9	[2] 11
France	9,101	7,833	7,234	6,695	6,704
Germany:					
East: Lignite	58,826	59,534	59,578	61,787	[2] 64,150
West:					
Anthracite and bituminous	8,624	6,209	5,192	5,753	5,367
Lignite	18,547	18,119	16,761	16,805	17,102
Hungary	805	1,046	1,193	1,171	[2] 1,200
Ireland	37	42	44	109	[2] 110
Italy, anthracite	18	12	26	30	[2] 30
Netherlands:					
Anthracite and bituminous	1,259	1,197	1,168	1,302	1,310
Lignite	89	83	71	69	82
Poland:					
Bituminous	732	707	753	791	[2] 770
Lignite	257	303	353	345	[2] 390
Portugal	100	83	66	60	[2] 55
Rumania [2]	300	300	305	330	330
Spain	1,523	1,580	1,408	1,560	[2] 1,200
Sweden	77	69	[2] 65	[2] 65	[2] 65
Switzerland [2]	110	110	110	110	110
U.S.S.R.[2]	9,400	9,400	9,400	9,400	9,400
United Kingdom	2,359	2,463	1,926	1,627	[2] 1,650
Yugoslavia	8	19	18	10	[2] 17
Total [2]	115,300	111,400	107,900	110,400	112,500
Asia:					
Indonesia	37	32	11	[2] 11	[2] 11
Japan	2,567	[2] 2,540	[2] 2,480	[2] 2,980	[2] 3,250
Korea, Republic of	583	1,450	[2] 2,200	2,455	[2] 2,480
Pakistan [2]	13	13	17	17	24
Turkey	65	128	139	154	[2] 140
Viet-Nam, South [2]	55	55	60	60	60
Total	3,320	[2] 4,220	[2] 4,910	[2] 5,670	[2] 5,970
Africa:					
Algeria	47	56	54	50	[2] 50
Morocco: Southern zone	21	20	22	25	[2] 30
Tunisia	12	2	[2] 6	[2] 6	[2] 6
Total	80	78	82	81	[2] 86
Oceania:					
Australia	694	723	753	1,694	[2] 2,100
New Zealand	18	19	18	17	[2] 17
Total	712	742	771	1,711	[2] 2,117
World total [2]	121,000	117,700	114,700	118,700	121,300

---

[1] Includes briquets made from coal, lignite, and peat and revisions of data published previously. Data do not add to totals shown owing to rounding.

[2] Estimated.

Compiled by Liela S. Price, Division of Foreign Activities.

Peat

By Eugene T. Sheridan[1] and Virginia C. Berté[2]

◆

CONTENTS

	Page
General summary	283
Government regulations	285
Scope of report	285
Reserves	287
Production	289
Consumption, uses, and shipments	289
Value and price	292
Foreign trade	294
Technology	296
World review	298

GENERAL SUMMARY

PEAT PRODUCTION in the United States continued to increase in 1961 and output reached 524,695 short tons. This quantity was an 11-percent increase over production in 1960, 48 percent more than in the base years, 1957–59, and the highest production reported to date.

A report on commercial production was received from 123 operations in 22 States. Michigan had the greatest output, also the largest number of operations. With nearly one-fourth of the active plants, Michigan produced 40 percent of the total peat. Indiana and Washington followed Michigan, each with 11 percent of the total output.

Approximately 20 percent of the total production was reported as moss peat, 50 percent reed-sedge peat, and 30 percent peat humus. Twenty-three percent was raw peat, and the remainder was processed. Virtually all was shredded, and 4 percent was kiln-dried. Twenty-one percent of the production was reported to have been cultivated before it was extracted.

Peat was used for a variety of agricultural and horticultural purposes, but 94 percent of the total was sold for general soil improvement. This included peat sold to contractors for landscape work and building lawns, and peat purchased by nurserymen, gardeners, and homeowners for starting and growing plants, improving garden soils and lawns, and for mulching. A small quantity was sold for specialized uses such as potting soils and seed inoculant, and for use in mushroom beds, mixed fertilizers, and earthworm culture. No peat was sold for use as fuel or energy.

Domestic peat was distributed in 45 States and the District of Columbia, and a small quantity was exported to Canada. Fifty-eight percent of the total sales were bulk; the remainder was packaged, chiefly in moisture-proof bags weighing 100 pounds or less. Nearly one-third of the producers sold packaged peat.

Although production increased, the total dollar value decreased 3 percent from 1960, because the average value of plant sales was lower. The decrease in unit value was caused chiefly by lower f.o.b. plant values for packaged peat.

---

[1] Supervisory commodity-industry analyst, Division of Bituminous Coal.
[2] Statistical clerk, Division of Bituminous Coal.

Imports decreased 4 percent from 1960 and were 6 percent lower than in the base years. Three-fourths of the total was imported from Canada; virtually all of the remainder, from Europe. European imports came principally from West Germany.

World production was estimated at 70 million short tons. Eighty-seven percent of the total was produced in the U.S.S.R. for fuel. Not included in the total was an additional quantity estimated at more than 100 million tons which was produced in the U.S.S.R. for agricultural use. The United States ranked fifth in the total output.

Salient peat statistics and the available supply of peat in the United States, 1950–61, are shown in table 1 and figure 1.

TABLE 1.—Salient peat statistics

	1957–59 (average)	1960	1961
United States:			
Number of operations	87	115	123
Production short tons	354,497	470,889	524,695
Value	$3,758,807	$5,138,331	$4,991,148
Average per ton	$10.60	$10.91	$9.51
Imports [1] short tons	267,525	263,877	252,437
Available for consumption [2] do	622,022	734,766	777,132
World production do	[3] 71,100,000	[3] 68,500,000	69,700,000

[1] Compiled from records of the U.S. Department of Commerce.
[2] Production plus imports.
[3] Revised figure.

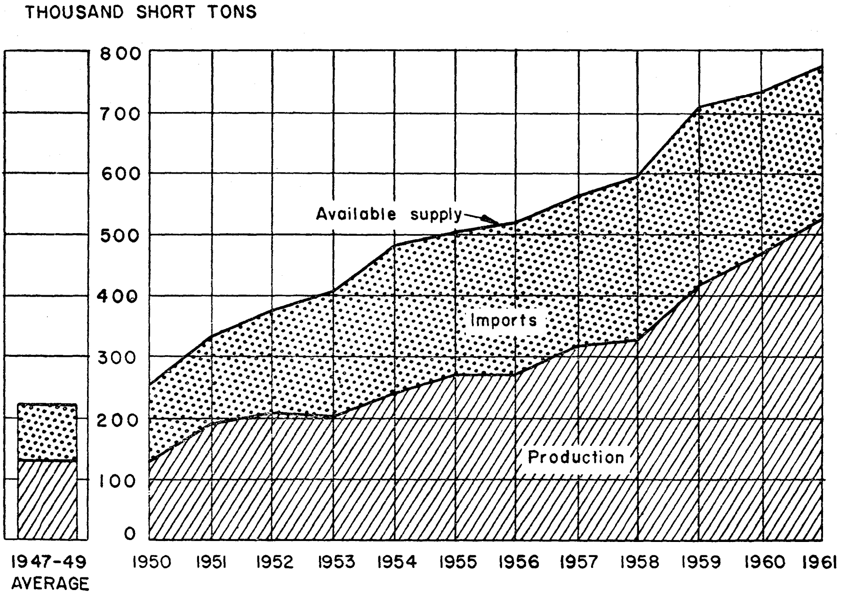

FIGURE 1.—Production, imports, and available supply of peat in the United States, 1950–61

GOVERNMENT REGULATIONS

There are no national standards for peat in the United States. Marketing of peat, however, is governed by regulations established by the Federal Trade Commission in 1950 to promote fair labeling and selling practices within the industry. These regulations, in general, forbid unfair or deceptive practices in marketing, misrepresentations, and the use of deceptive trade or corporate names. They also state the requirements for labeling a product "peat" and the manner in which the terms "peat moss" and "moss peat" may be used. Peat is defined as any partially decomposed plant matter that has accumulated under water or in a water-saturated environment. It is unlawful to designate a product "peat" unless 75 percent of the material, on a dry-weight basis, is composed of peat, as defined above, and the remainder consists of normally associated soil materials. A product labeled "moss peat" must contain at least 75 percent peat that was formed from sphagnum, hypnum, and/or other mosses. The use of the term "peat moss", a misnomer generally applied to all types of peat, also is subject to the requirements for "moss peat" except when the kind or kinds of peat of which the product is composed are conspicuously stated in immediate conjunction with the term "peat moss".

The trade-practice rules also prohibit discriminatory practices in pricing, grants for service or facilities, and advertising or promotional allowances. To further protect the public and assist consumers in using the various kinds of peat, the rules recommend that producers voluntarily furnish such facts as moisture content, acidity, ash content, moisture-holding capacity, and degree of decomposition of the peat. They also recommend that peat be sold on a dry-measure basis and that information be furnished relative to the principal uses for which the product is suitable.

Government purchases of peat are subject to Federal specifications, developed by the Federal Supply Service, General Services Administration. The current specification, Q-P-00166d(AGR-ARS), June 20, 1960, classifies peat into 4 types; (1) sphagnum-moss peat, (2) other moss peats, (3) humus peat, and (4) reed-sedge peat, and lists the requirements for each type. It also supplies information on sampling, inspection, and testing procedures and outlines the requirements for packaging and marking.

SCOPE OF REPORT

Each year the Bureau of Mines canvasses all known peat producers in the United States and publishes a report based upon their operations. This survey of the industry has been continuous since 1934 when the Bureau resumed the canvass conducted from 1908 to 1926 by the Federal Geological Survey. No data were collected or published by either agency between 1926 and 1934.

All data, except where noted, were based upon reports supplied voluntarily by producers. Complete coverage of the industry was attempted, and all reported production is included in this report. No estimates were made for nonreporting companies, and a company was assumed to have been idle or not a producer if it did not respond. Questionnaires were mailed to all companies who reported commercial production within the last 3 years; also, to companies who were reported as possible peat producers. Mailing lists are kept current by requesting producers to furnish the names and addresses of new operations in their areas, by checking individual State mineral and commodity reports, and from information furnished by Bureau of Mines field personnel in various regional areas of the United States.

Of the companies canvassed, 122 reported production at 123 operations. Five additional companies indicated that they produced peat, but did not state the quantity; no estimate of production was made for these producers. Eleven companies were idle; 7 were abandoned; and 6 reported that they were not producers. Only 10 companies that reported production in 1960 did not reply, and their combined production for that year was a negligible part of the total. Because of the nature of the peat industry in the United States, this survey may have failed to reach all producers. The authors feel, however, that all major and most of the smaller producers were canvassed and that the figures for production include virtually all commercially produced peat in the United States.

Peat is classified in this report into three general types—moss peat, reed-sedge peat, and humus. The first two types differentiate peat according to botanical origin. Moss peat is that formed chiefly from sphagnum, hypnum, and/or other mosses, while reed-sedge peat is a type formed principally from reeds, sedges, and other associated swamp plants. In both types the plant remains are identifiable, but the reed-sedge peats usually are more decomposed than those formed from mosses. The third type, humus, includes all peat so decomposed that its biological identity cannot be determined. Humus sometimes is called peat muck.

These classifications are less restrictive than those of the Federal specifications, but the nature of the domestic peat industry makes it impractical to make them more limiting, particularly, for reporting purposes. A few producers reported output of more than one type of peat, as some deposits contained layers of different types that were removed separately in some instances.

Raw peat had no processing after excavation other than air drying. Processed peat was shredded, pulverized, and/or kiln-dried. Cultivated peat was prepared prior to excavation by turning over the surface layer of the deposit with a disk or spring-toothed harrow. This procedure aerated and reduced the moisture content of several inches of peat on the top of the deposit which, subsequently, was removed and the cultivation repeated.

Data were collected on production, sales, values, uses, shipments, location and size of deposits, and types of equipment used. The data on uses included peat produced in the United States only, as no information was available on the imported peat other than that it was imported for use in soil improvement and poultry and stable litter. In a few instances where sales according to use were not reported, the production was assumed to have been sold for general soil improvement. No information was collected on stocks as peat normally is sold as produced. Some peat remained in stockpiles at the end of 1961, however.

All values for domestic peat were based upon producers' selling prices at the operation, but do not include the cost of containers. In a few instances, values were estimated when a producer failed to state the value of his sales.

The terms "consumption" and "distribution" were used synonymously as it was assumed that peat was used in the States where shipped by producers. Where shipments were not specified, it was assumed that the peat was consumed in the State where it was produced.

All quantities are in short tons of 2,000 pounds.

RESERVES

The peat resources of the United States were surveyed by the Federal Geological Survey between 1914 and 1919 and reserves were estimated at 13.8 billion tons of air-dried peat. These reserves remain virtually intact as less than 0.05 percent of the estimated total has been excavated since the survey was made.

The major peat areas are in the northern and Atlantic Coast regions of the United States. A small quantity (less than 1 percent of the total) also occurs in the Gulf Coast area, in California, and in the basins of several lakes and rivers in Oregon and Washington. There are minor quantities also in several other States.

Peat occurs in 30 States, but about two-thirds of the total is in Minnesota and Wisconsin. Minnesota reserves are estimated at 6.8 billion tons, covering about one-tenth of the total land area. Wisconsin has about 1 million acres of peat land, containing 2.5 billion tons. These States are in the northern region, which also includes Michigan, New York, New Jersey; the northern parts of Iowa, Illinois, Indiana, Ohio, and Pennsylvania; and the New England States. The northern region has 80 percent of the total reserves.

The deposits of Minnesota and Wisconsin occur principally in basins of glacial origin. The deepest and most extensive are in the northern and central areas where peat has accumulated in former lakes and ponds from the deposition of aquatic plants. In most areas, however, these deposits are covered with a layer of "built-up" peat, formed principally from mosses that grew on the surface of the deposit after the basin was filled to the level of the surrounding countryside. Many deposits have live sphagnum growing on the surface under which is a stratum of sphagnum-moss peat. The stratum varies in thickness, but is quite thin in almost every area, too thin, in fact, for the commercial production of moss peat. The remaining peat in such bogs is principally of the reed-sedge type, except for the bottom portions, which usually consist of well-decomposed material that can be classed as humus. Many of the bogs also are covered with a dense overgrowth of spruce and tamarack. Substantial deposits of peat occur in the southern parts of these States but, in general, they are smaller and more shallow. Reed-sedge peat predominates also, but the bogs are characterized chiefly by grass-sedge meadows and marshes.

The Upper Peninsula of Michigan has extensive deposits of peat, similar to those of Minnesota and Wisconsin. Peat also occurs in the southern part of Michigan, but the southern deposits generally are much smaller and the peat is more decomposed.

Deposits in other States of the northern region, excluding New England, were formed chiefly in marshes, ponds, and shallow lakes from reeds, sedges, marsh grasses, and other swamp plants. The northern parts of several States also have some built-up deposits containing an upper layer of moss peat, but in general, mosses, particularly sphagnum, did not contribute greatly to peat formation in most of the remaining States of the Northern region.

Peat occurs in all New England States, but four-fifths of the reserves in New England are in Maine. The Maine deposits are of two types—the filled-basin, with peat similar to that in Minnesota, and the climbing bog, where peat is formed predominantly from mosses. Climbing-bog deposits are in the flat or gently sloping coastal and inland areas of eastern and southern Maine. This type of bog is common in Ireland and other parts of northwestern Europe. Peat in these bogs is light-colored, fibrous, and relatively homogeneous and is similar to the moss peat imported from Canada and Germany. Large deposits also are in northern and western Maine, but many are in heavily forested swamps that are inaccessible. Researchers estimated that deposits in Maine contain 100 million tons of air-dried peat.

All States along the Atlantic Coast have peat deposits, but about 75 percent of the estimated 2.7 billion tons of this region is in Florida. Peat is found in all parts of Florida, which ranks third in total reserves. The Dismal Swamp in Virginia and North Carolina is the second largest peat area of the Atlantic Coast region.

Known original reserves of peat in the United States, as reported by the Federal Geological Survey, are shown in table 2.

TABLE 2.—Known original reserves of peat in the United States, estimated on an air-dried basis, by regions and States [1]

(Thousand short tons)

Region and State	Reserves	Region and State	Reserves
Northern region:		Atlantic Coast region:	
Minnesota	6,835,000	Virginia and North Carolina	700,000
Wisconsin	2,500,000	Florida	2,000,000
Michigan	1,000,000	Other States [2]	2,000
Iowa	22,000		
Illinois	10,000	Total	2,702,000
Indiana	13,000		
Ohio	50,000	Other regions:	
Pennsylvania	1,000	Gulf Coast [3]	2,000
New York	480,000	California	72,000
New Jersey	15,000	Oregon and Washington	1,000
Maine	100,000		
New Hampshire	1,000	Total	75,000
Vermont	8,000		
Massachusetts	12,000	Total all regions	13,827,000
Connecticut	2,000		
Rhode Island	1,000		
Total	11,050,000		

---

[1] Geological Survey, Coal Resources of the United States (Progress Report): Circ. 293, Oct. 1, 1953, p. 38.

[2] Includes Delaware, Maryland, South Carolina, and Georgia.

[3] Excludes Florida.

PRODUCTION

Production continued upward in 1961 and output reached 525,000 short tons. This was an 11-percent increase over the previous year and 48 percent more peat than was produced in the base years, 1957–59.

The number of active operations also increased, as 123 plants in 22 States reported commercial production. This was eight more than in 1960. Michigan had the largest number of operations, nearly one-fourth of the total. Washington and Ohio followed with 19 and 15 plants, respectively.

Producers in two additional States (Maryland and Montana) reported production for 1961. This was the first year that either State had any known commercial operations. There also was one active plant in Alaska, but this operation reported after the closing date of the canvass and its production was not included in this report.

Michigan had the highest production—40 percent of the total. Following in order of output were Indiana and Washington, each with 11 percent of the total, and California with 9 percent. These four States had nearly three-fourths of the domestic output.

Approximately 20 percent of the production was moss peat, 50 percent reed-sedge peat, and 30 percent humus. Twenty-three percent was sold as produced; the remainder was processed by shredding and/or kiln drying. Twenty-one percent was cultivated before it was excavated. This method of preparation is described in the scope of this report.

Production methods varied greatly, but all peat was excavated with machinery. This consisted chiefly of conventional types of excavation and earth-moving equipment and included powershovels, drag lines, bulldozers, clamshells, front-end loaders, dredges, and belt and bucket loaders. A few operations had specially designed excavating and conveying equipment. Processing machinery included a variety of shredders, grinders, hammermills, screens, and dryers.

Production by States and by types is shown in tables 3 and 4.

CONSUMPTION, USES, AND SHIPMENTS

The decrease in imports was more than offset by the rise in production, and more peat was available for consumption in 1961 than in any previous year. As the quantity available (imports plus production) is an indication of requirements, a reasonable assumption would be that more peat also was consumed.

Peat was used for a variety of agricultural and horticultural purposes, but 94 percent of the total was reported to have been sold for general soil improvement. This peat was used chiefly by landscape contractors and gardeners as a base for building lawns and starting plants, by homeowners for improving lawns and garden soils, and by nurseries and greenhouses. Three percent was sold for use in potting soils, and the remainder for a variety of specialized uses that included seed inoculant, mushroom beds, mixed fertilizers, packing flowers, earthworm culture, and golf-course greens. No peat was sold for use as fuel or energy.

TABLE 3.—Peat produced in the United States, by States

State	1960			1961		
	Number of operations	Short tons	Value	Number of operations	Short tons	Value
Alaska	1	376	(1)	---	---	---
California	5	33,091	$481,181	5	46,348	$501,082
Colorado	3	9,384	37,542	4	9,894	43,870
Connecticut	2	(1)	(1)	1	(1)	(1)
Florida	7	39,275	162,093	5	24,573	148,675
Georgia	3	6,904	73,578	1	1,032	(1)
Idaho	2	(1)	(1)	2	(1)	(1)
Illinois	3	6,179	27,947	3	6,597	29,513
Indiana	7	27,486	290,338	7	57,146	501,850
Iowa	2	(1)	(1)	2	(1)	(1)
Maryland	---	---	---	1	(1)	(1)
Massachusetts	1	(1)	(1)	2	(1)	(1)
Michigan	32	214,402	2,755,245	29	209,266	2,002,310
Minnesota	5	1,465	72,393	7	11,091	180,736
Montana	---	---	---	3	7,385	112,090
New Hampshire	1	23	(1)	1	15	(1)
New Jersey	4	25,100	191,580	4	21,257	212,155
New York	3	10,042	145,628	3	11,209	123,200
Ohio	13	6,755	92,848	15	9,113	122,881
Pennsylvania	6	30,837	324,557	6	27,993	291,294
South Carolina	1	(1)	(1)	1	(1)	(1)
Washington	13	27,770	120,748	19	55,543	359,099
Wisconsin	1	8,500	(1)	2	(1)	(1)
Undistributed	---	23,300	362,653	---	26,233	362,393
Total	115	470,889	5,138,331	123	524,695	4,991,148

[1] Included with "Undistributed" to avoid disclosing individual company figures.

TABLE 4.—Peat produced in the United States in 1961, by kinds

(Short tons)

Kind	Total	Raw	Processed	
			Shredded	Shredded and kiln-dried
Moss	107,739	31,738	62,863	13,138
Reed-sedge	261,819	28,624	233,195	---
Humus	155,137	60,601	91,525	[1] 3,011
Total	[2] 524,695	120,963	387,583	16,149

[1] Includes small quantity not shredded.
[2] Includes 110,728 tons of cultivated peat.

Domestic peat was sold in 45 States, the District of Columbia, and Canada. No producer shipments were made to Alaska, Hawaii, North Dakota, South Dakota, and Vermont. Michigan was the largest consumer, receiving 14 percent of all peat sold. All consumed in Michigan was produced within the State. Michigan also was the leading distributor, shipping peat to 43 other States, the District of Columbia, and Canada. Washington, Pennsylvania, California, and Ohio ranked after Michigan in consumption, in the order named. These States and Michigan consumed 52 percent of the total domestic peat distributed. Washington and California produced most of the peat sold within their borders. The greater part of the peat sold in Ohio and Pennsylvania, however, was shipped from other States. Table 5 shows the destination of peat shipments.

TABLE 5.—Destination of peat shipments[1]

(Short tons)

State	1960	1961	State	1960	1961
Alabama	224	775	Nevada	706	311
Alaska	376	--------	New Hampshire	38	179
Arizona	1,818	2,782	New Jersey	26,563	24,094
Arkansas	124	190	New Mexico	1,204	1,232
California	31,738	45,638	New York	38,903	36,920
Colorado	9,821	10,706	North Carolina	5,149	1,636
Connecticut	4,975	3,580	North Dakota	32	--------
Delaware	987	1,042	Ohio	32,101	45,547
District of Columbia	2,846	6,471	Oklahoma	1,107	2,643
Florida	39,763	24,526	Oregon	315	3,503
Georgia	4,173	3,167	Pennsylvania	48,741	46,104
Idaho	1,563	296	Rhode Island	933	1,001
Illinois	9,621	15,074	South Carolina	3,885	2,577
Indiana	11,375	19,167	Tennessee	3,724	3,302
Iowa	9,037	6,504	Texas	7,008	9,337
Kansas	674	1,277	Utah	435	1,631
Kentucky	2,994	7,673	Virginia	3,668	3,690
Louisiana	96	619	Washington	27,489	48,437
Maine	150	68	West Virginia	1,224	2,319
Maryland	13,895	13,833	Wisconsin	1,301	4,560
Massachusetts	4,520	5,162	Wyoming	53	101
Michigan	68,049	66,320			
Minnesota	1,492	2,087	Total	430,531	486,258
Mississippi	--------	36	Exported	133	168
Missouri	5,150	9,246			
Montana	194	547	Grand total	430,664	486,426
Nebraska	297	348			

[1] Based upon reports from producers showing destination of peat used or sold.

Forty-two percent of the peat sold was packaged. In terms of total sales, this was about 4 percent more than in 1960. The quantity sold packaged, however, was 27 percent greater than in the preceding year. This continued the steady increase in packaged sales that has resulted since the introduction, several years ago, of synthetic films from which inexpensive, moisture-proof containers are manufactured. Such containers have enabled producers to distribute peat nationally, whereas only a few years ago it was uneconomical to ship peat out of the producing area.

Producers' sales of peat by uses, kinds, and States are shown in tables 6, 7, 8, and 9.

TABLE 6.—Peat sold in the United States in 1961, by uses

Use	In bulk			In packages			Total		
	Short tons	Value		Short tons	Value		Short tons	Value	
		Total	Average		Total	Average		Total	Average
Soil improvement	258,945	$1,675,510	$6.47	198,532	$2,506,906	$12.63	457,477	$4,182,416	$9.14
Potting soils	10,953	69,372	6.33	4,292	60,705	14.14	15,245	130,077	8.53
Seed inoculant	--------	----------	------	2,361	162,843	68.97	2,361	162,843	68.97
Mushroom beds	2,734	19,413	7.10	--------	----------	------	2,734	19,413	7.10
In mixed fertilizers	2,320	24,241	10.45	--------	----------	------	2,320	24,241	10.45
Other[1]	5,360	90,071	16.80	929	19,294	20.77	6.289	109,365	17.39
Total	280,312	1,878,607	6.70	206,114	2,749,748	13.34	486,426	4,628,355	9.52

[1] Includes peat used for packing flowers, as an earthworm-culture medium, and on golf courses.

TABLE 7.—Peat sold in the United States in 1961, by kinds

(Short tons)

Kind	In bulk			In packages			Total		
	Quantity	Value		Quantity	Value		Quantity	Value	
		Total	Average		Total	Average		Total	Average
Moss	66,307	$504,217	$7.60	41,297	$664,147	$16.08	107,604	$1,168,364	$10.86
Reed-sedge	81,181	731,534	9.01	158,271	1,859,543	11.75	239,452	2,591,077	10.82
Humus	132,824	642,856	4.84	6,546	226,058	34.53	139,370	868,914	6.23
Total	280,312	1,878,607	6.70	206,114	2,749,748	13.34	486,426	4,628,355	9.52

TABLE 8.—Peat sold in the United States in 1961, by kinds and uses

Use	Moss			Reed-sedge			Humus		
	Short tons	Value		Short tons	Value		Short tons	Value	
		Total	Average		Total	Average		Total	Average
Bulk:									
Soil improvement	64,214	$487,673	$7.59	71,660	$597,604	$8.34	123,071	$590,233	$4.80
Other uses	2,093	16,544	7.90	9,521	133,930	14.07	9,753	52,623	5.40
Total	66,307	504,217	7.60	81,181	731,534	9.01	132,824	642,856	4.84
Packaged:									
Soil improvement	40,941	652,817	15.95	153,468	1,796,747	11.71	4,123	57,342	13.91
Other uses	356	11,330	31.83	4,803	62,796	13.07	2,423	168,716	69.63
Total	41,297	664,147	16.08	158,271	1,859,543	11.75	6,546	226,058	34.53
Total:									
Soil improvement	105,155	1,140,490	10.85	225,128	2,394,351	10.64	127,194	647,575	5.09
Other uses	2,449	27,874	11.38	14,324	196,726	13.73	12,176	221,339	18.18
Grand total	107,604	1,168,364	10.86	239,452	2,591,077	10.82	139,370	868,914	6.23

VALUE AND PRICE

The f.o.b. plant value of all peat sold in 1961 was $4.6 million, an increase of 4 percent over 1960. However, the increase in sales value was not proportional to the increases in sales because of lower average prices at most plants.

The average price per ton of all peat sold was $9.52. Average prices of the different types varied greatly, however, and were dependent chiefly upon whether the peat was raw or processed and sold in bulk or in packages. Peat was sold in bulk at an average price per ton of $6.70, and was sold packaged at $13.34. Packaged humus had the highest unit price—$34.53 per ton. Approximately one-third of this material was finely ground and kiln-dried for use as seed inoculant. Bulk humus had the lowest average price—$4.84 per ton. This material was sold principally by the ton or cubic yard for general soil improvement.

The total value of imported peat decreased slightly in 1961 because less peat was imported. The unit value, however, was slightly higher.

TABLE 9.—**Peat sold in the United States, by States**

State	1960					
	In bulk		In packages		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
Alaska	376	(1)	----------	----------	376	(1)
California	18,766	$248,626	13,325	$223,475	32,091	$472,101
Colorado	9,384	37,542	----------	----------	9,384	37,542
Connecticut	(1)	(1)	----------	----------	(1)	(1)
Florida	39,275	162,093	----------	----------	39,275	162,093
Georgia	6,519	(1)	385	(1)	6,904	73,578
Idaho	(1)	(1)	----------	----------	(1)	(1)
Illinois	6,179	27,947	----------	----------	6,179	27,947
Indiana	(1)	(1)	(1)	(1)	24,484	255,250
Iowa	(1)	(1)	----------	----------	(1)	(1)
Maryland	----------	----------	----------	----------	----------	----------
Massachusetts	(1)	(1)	----------	----------	(1)	(1)
Michigan	66,362	344,344	124,727	1,905,352	191,089	2,249,696
Minnesota	90	975	1,352	68,820	1,442	69,795
Montana	----------	----------	----------	----------	----------	----------
New Hampshire	23	(1)	----------	----------	23	(1)
New Jersey	(1)	(1)	(1)	(1)	24,650	187,000
New York	(1)	(1)	(1)	(1)	6,602	93,271
Ohio	5,762	45,306	993	47,542	6,755	92,848
Pennsylvania	22,512	178,148	6,725	133,609	29,237	311,757
South Carolina	(1)	(1)	(1)	(1)	(1)	(1)
Washington	27,344	119,469	----------	----------	27,344	119,469
Wisconsin	----------	----------	1,529	(1)	1,529	(1)
Undistributed	65,868	645,875	13,168	267,387	23,300	304,163
Total	268,460	1,810,325	162,204	2,646,185	430,664	4,456,510
	1961					
Alaska	----------	----------	----------	----------	----------	----------
California	17,498	$216,032	25,850	$270,550	43,348	$486,582
Colorado	9,894	43,870	----------	----------	9,894	43,870
Connecticut	(1)	(1)	----------	----------	(1)	(1)
Florida	23,723	135,149	----------	----------	23,723	135,149
Georgia	437	(1)	595	(1)	1,032	(1)
Idaho	(1)	(1)	(1)	(1)	(1)	(1)
Illinois	6,597	29,513	----------	----------	6,597	29,513
Indiana	(1)	(1)	(1)	(1)	49,452	456,782
Iowa	(1)	(1)	----------	----------	(1)	(1)
Maryland	(1)	(1)	(1)	(1)	(1)	(1)
Massachusetts	(1)	(1)	(1)	(1)	(1)	(1)
Michigan	67,669	345,978	137,962	1,637,854	205,631	1,983,832
Minnesota	1,609	16,593	4,322	108,260	5,931	124,853
Montana	----------	----------	415	13,813	415	13,813
New Hampshire	15	(1)	----------	----------	15	(1)
New Jersey	(1)	(1)	(1)	(1)	17,277	167,012
New York	(1)	(1)	(1)	(1)	8,329	91,800
Ohio	7,831	(1)	1,282	(1)	9,113	122,881
Pennsylvania	22,242	182,261	2,751	68,893	24,993	251,154
South Carolina	(1)	(1)	(1)	(1)	(1)	(1)
Washington	41,990	147,452	12,353	205,028	54,343	352,480
Wisconsin	(1)	(1)	(1)	(1)	(1)	(1)
Undistributed	80,807	761,759	20,584	445,350	26,333	368,634
Total	280,312	1,878,607	206,114	2,749,748	486,426	4,628,355

[1] Included with "Undistributed" to avoid disclosing individual company figures.

Imported peat had an average value about 5 times greater than that shown for domestic peat, but the values are not comparable because they were assigned at different marketing levels. Values shown for domestic peat were the amount realized by producers from sales; values for imported peat were established at the port of embarkation and were equal to the prices paid by importers, less transportation and other miscellaneous charges. In some instances the values assigned to foreign peat also may have included other nondutiable charges such as marine insurance and freight.

Foreign and domestic peats are difficult to compare on a cost-per-unit basis, because they have different properties and usually vary greatly in moisture content. Foreign peat is light and fibrous; generally is packaged in bales; and is sold on a volume basis. Most packaged domestic peats are finely ground or well decomposed; are packaged in polyethylene-lined bags; and usually are sold by weight. As an indication of their respective densities, each 100 pounds of a typical imported peat will measure approximately 12 bushels, whereas 100 pounds of a typical domestic peat will measure only 3 or 4.

In most areas retail prices of domestic peat were lower than in 1960. Packaged domestic peat could be purchased in the Washington, D.C., area for $1.39 per 100-pound bag. A 7½-cubic-foot bale of imported peat could be purchased for $4 to $5.

FOREIGN TRADE

Imports decreased 4 percent from 1960 and were 6 percent lower than in the base years, 1957–59.

Canada continued to be the principal supplier of foreign peat, shipping three-fourths of the total imported. The remainder, except for a negligible quantity from Japan and Mexico, was imported from Europe.

West Germany supplied 74 percent of the European peat, and Poland-Danzig, Denmark, and the Netherlands supplied virtually all of the remainder. Minor quantities were imported from Belgium-Luxembourg, Finland, Ireland, Norway, Sweden, U.S.S.R., and the United Kingdom.

Imports from Europe declined 40 percent, chiefly because of smaller shipments from West Germany and the Netherlands, whereas, imports from Canada increased 20 percent.

Shipments from Canada entered the United States principally through the Buffalo, Dakota, Michigan, St. Lawrence, Vermont, and Washington customs districts. West German imports were shipped chiefly to the Florida, Maryland, New Orleans, New York, and Philadelphia districts.

Imported peat was classified according to use into two grades: "Poultry and Stable" and "Fertilizer". Data were not available on end uses. Generally, poultry and stable grade was imported for use as poultry and animal litter, whereas fertilizer grade was imported for various types of soil improvement. Of the total imports, 97 percent was fertilizer grade which entered the United States duty free. A duty of $0.25 per long ton was levied on peat classified as "Poultry and Stable" grade.

Ninety-six percent of the Canadian imports were Fertilizer grade, most of which was baled or packaged in paper cartons with synthetic film liners. Canadian peat is classified also according to texture—coarse, medium, and fine. Coarse is used chiefly for stable litter; medium, for poultry and small animal litter; and fine, for soil conditioning, packing, and insulation.

Imports from Europe were chiefly Fertilizer grade and were similar in quality to the peat imported from Canada.

TABLE 10.—Peat moss imported for consumption in the United States, by kinds and by countries

Country	Poultry and stable grade		Fertilizer grade		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
			1959			
North America:						
Canada	6,340	$450,472	171,785	$8,975,697	178,125	$9,426,169
Mexico	19	527	---	---	19	527
Total	6,359	450,999	171,785	8,975,697	178,144	9,426,696
Europe:						
Belgium-Luxembourg	---	---	47	1,410	47	1,410
Denmark	---	---	5,354	232,665	5,354	232,665
France	---	---	42	1,634	42	1,634
Germany, West	3,025	107,692	85,031	3,143,205	88,056	3,250,897
Netherlands	295	15,230	8,808	368,347	9,103	383,577
Poland and Danzig	---	---	5,500	249,925	5,500	249,925
Sweden	25	1,024	12	640	37	1,664
United Kingdom	---	---	399	27,549	399	27,549
Total	3,345	123,946	105,193	4,025,375	108,538	4,149,321
Asia: Japan	9	2,250	28	1,831	37	4,081
Grand total	9,713	577,195	277,006	13,002,903	286,719	13,580,098
			1960			
North America:						
Canada	5,593	353,993	151,860	8,918,092	157,453	9,272,085
Mexico	25	915	---	---	25	915
Total	5,618	354,908	151,860	8,918,092	157,478	9,273,000
Europe:						
Belgium-Luxembourg	---	---	46	3,390	46	3,390
Czechoslovakia	---	---	43	2,186	43	2,186
Denmark	---	---	5,553	256,204	5,553	256,204
Finland	---	---	83	2,944	83	2,944
Germany, West	3,303	131,836	80,282	3,108,597	83,585	3,240,433
Ireland	---	---	273	12,837	273	12,837
Netherlands	150	8,406	7,853	334,498	8,003	342,904
Norway	---	---	24	5,649	24	5,649
Poland and Danzig	---	---	8,120	332,235	8,120	332,235
Sweden	---	---	524	29,400	524	29,400
United Kingdom	---	---	132	5,342	132	5,342
Total	3,453	140,242	102,933	4,093,282	106,386	4,233,524
Asia: Japan	12	2,371	1	120	13	2,491
Grand total	9,083	497,521	254,794	13,011,494	263,877	13,509,015
			1961			
North America:						
Canada	6,614	478,461	182,176	10,196,741	188,790	10,675,202
Mexico	80	2,969	---	---	80	2,969
Total	6,694	481,430	182,176	10,196,741	188,870	10,678,171
Europe:						
Belgium-Luxembourg	---	---	60	2,885	60	2,885
Denmark	9	400	4,013	184,850	4,022	185,250
Finland	---	---	72	3,975	72	3,975
Germany, West	1,717	63,327	45,482	1,747,199	47,199	1,810,526
Ireland	---	---	381	15,371	381	15,371
Netherlands	175	11,062	3,264	134,352	3,439	145,414
Norway	---	---	40	10,713	40	10,713
Poland and Danzig	---	---	7,583	280,880	7,583	280,880
Sweden	---	---	508	35,505	508	35,505
U.S.S.R.	---	---	175	5,468	175	5,468
United Kingdom	---	---	80	2,440	80	2,440
Total	1,901	74,789	61,658	2,423,638	63,559	2,498,427
Asia: Japan	8	1,876	---	---	8	1,876
Grand total	8,603	558,095	243,834	12,620,379	252,437	13,178,474

Source: Bureau of the Census.

TABLE 11.—Peat moss imported for consumption in the United States in 1961, by kinds and customs districts

Customs district	Poultry and stable grade		Fertilizer grade		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
Buffalo	72	$3,253	26,574	$1,250,611	26,646	$1,253,864
Chicago	22	1,103	------	------	22	1,103
Dakota	3,583	298,356	14,259	1,010,869	17,842	1,309,225
Duluth and Superior	88	6,476	341	18,530	429	25,006
Florida	17	560	7,474	255,882	7,491	256,442
Galveston	97	7,125	1,700	62,516	1,797	69,641
Georgia	------	------	453	13,311	453	13,311
Hawaii	8	1,876	6	637	14	2,513
Indiana	------	------	21	426	21	426
Laredo	81	2,969	24	656	105	3,625
Los Angeles	------	------	1,612	91,293	1,612	91,293
Maine and New Hampshire	6	200	3,314	175,354	3,320	175,554
Maryland	223	7,301	5,849	242,634	6,072	249,935
Massachusetts	18	685	2,159	80,794	2,177	81,479
Michigan	1,228	62,628	22,967	1,029,032	24,195	1,091,660
Mobile	------	------	3,227	120,463	3,227	120,463
New Orleans	971	33,354	6,441	257,042	7,412	290,396
New York	338	18,458	16,515	705,393	16,853	723,851
North Carolina	------	------	309	10,756	309	10,756
Ohio	21	726	------	------	21	726
Oregon	------	------	322	10,927	322	10,927
Philadelphia	88	2,587	9,982	325,240	10,070	327,827
Puerto Rico	------	------	84	2,869	84	2,869
Rhode Island	------	------	24	633	24	633
St. Lawrence	158	7,219	16,629	688,130	16,787	695,349
San Francisco	------	------	611	21,107	611	21,107
South Carolina	77	1,500	630	26,441	707	27,941
Vermont	417	17,714	33,795	1,438,234	34,212	1,455,948
Virginia	20	640	3,970	186,415	3,990	187,055
Washington	1,053	82,317	64,542	4,594,184	65,595	4,676,501
Wisconsin	17	1,048	------	------	17	1,048
Total	8,603	558,095	243,834	12,620,379	252,437	13,178,474

Source: Bureau of the Census.

Data on imports are shown in tables 10, 11, and 12. Only a negligible quantity of peat was exported.

TECHNOLOGY

A proposal for cooperative research to study the use of European black peat for the production of fertilizers or soil conditioners was submitted recently to the Organization for Economic Cooperation and Development (OECD), an international trade organization comprised of 16 west European countries, Canada, Ireland, Turkey, and the United States.[3] Black peat is the European common name for highly-decomposed moorland peat which is produced in large quantities in Europe, where it is used chiefly as a source of primary energy. At the present time there is a considerable amount of interest in several countries, particularly in Germany, for finding other uses for black peat, and the above proposal suggests research aimed at investigating the use of this material, or upgrading it by chemical or biological means, for agricultural and horticultural purposes.

---

[3] Organization for Economic Cooperation and Development, Committee for Scientific Research. Proposal for Cooperative Research To Study the Use of Black Peat in the Production of Fertilizers. Dispatch, U.S. Department of State; March 13, 1962.

TABLE 12.—Peat moss imported from Canada and West Germany in 1961, by kinds and by customs districts

Customs district	Canada				West Germany			
	Poultry and stable grade		Fertilizer grade		Poultry and stable grade		Fertilizer grade	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Buffalo	72	$3,253	26,574	$1,250,611				
Chicago					22	$1,103		
Dakota	3,583	298,356	14,259	1,010,869				
Duluth and Superior	88	6,476	341	18,530				
Florida					17	560	7,155	$244,346
Galveston					97	7,125	1,450	53,665
Georgia							377	11,834
Hawaii			3	292			3	345
Indiana							21	426
Laredo							24	656
Los Angeles							1,104	53,185
Maine and New Hampshire	6	200	3,314	175,354				
Maryland					223	7,301	4,266	157,287
Massachusetts	12	510	6	255	6	175	770	27,362
Michigan	1,208	61,368	22,742	1,021,256	19	1,260	225	7,776
Mobile							3,099	112,021
New Orleans					962	32,954	4,874	175,736
New York					164	7,396	11,233	508,419
North Carolina							238	8,317
Ohio					21	726		
Oregon							322	10,927
Philadelphia					89	2,587	6,210	201,582
Puerto Rico							84	2,869
St. Lawrence	158	7,219	16,611	687,458			18	672
San Francisco							576	19,272
South Carolina					77	1,500	630	26,441
Vermont	417	17,714	33,795	1,438,234				
Virginia					20	640	2,792	123,759
Washington	1,053	82,317	64,531	4,593,882			11	302
Wisconsin	17	1,048						
Total	6,614	478,461	182,176	10,196,741	1,717	63,327	45,482	1,747,199

Source: Bureau of the Census.

A fibrous brown or white variety of peat, formed chiefly from sphagnum, is the type conventionally used for soil conditioning in Europe. This type is expensive, however, because it is prepared almost universally by hand-cutting and air-drying. Also, the reserves are becoming exhausted in many countries. Previous research has shown that certain substances in peat affect plant growth and that their influence on plant development can be modified to some extent by chemical reactions. The proposed research will endeavor to identify and study these substances in black peat and use the knowledge obtained to develop a fertilizer material or soil conditioning product. Besides being available in vast quantities in many countries, black peat can be produced cheaply because it is harvested mechanically. Current experiments in Britain also indicate that peat can be pressure-dewatered. No data are available, however, on such a drying process.

A new and interesting machine developed in Germany by the Demag Excavator Factory and called the G.161 Ditcher,[4] presents possibilities for recovering peat from areas too wet to support conventional types of drainage and excavation equipment. The machine is a tractor-type vehicle to which is attached a disk ditcher. The tracks of the vehicle are equipped with light, metal, box plates that give the vehicle an extremely low ground pressure and enable it to operate on areas of the lowest bearing strength. These areas must be free from obstacles such as rocks and tree stumps, but low vegetation and plant roots do not interfere with the equipment. The drive is designed to work or travel either forward or backward, and the steering and controls are arranged to operate when travel is in either direction.

---

[4] The Demag Disk-Ditcher G. 161. Informationsdienst der Demag Baggerfabrik, v. 3, No. 1, pp. 7–9.

WORLD REVIEW

Ninety-nine percent of the estimated world peat was produced in Europe; the remainder (less than 1 million tons), in Argentina, Canada, Israel, Japan, Korea, and the United States. The U.S.S.R. was the largest producer with production estimated at 60.6 million tons. This quantity, however, included only the peat produced for fuel. Not included was an additional amount estimated at more than 100 million tons that was produced for agricultural use.

The peat resources of the Soviet Union are estimated at 174 billion tons of air-dried peat, about 60 percent of the world total. Because of a chronic shortage of other fuels in certain areas, these reserves have been exploited and the Soviet government has developed a peat industry[5] that supplied, in 1955, an estimated 6 percent of the total industrial fuel consumed in the U.S.S.R. Peat is used for fuel by various industrial enterprises in the Soviet Union, but the major use for fuel peat is the generation of electric power. The current total installed capacity of peat-fired power stations is reported to approach 2,000 megawatts[6] and many cities, particularly Moscow, Leningrad, Gorki, Minsk, Yaroslavl, and Ivanovo, are supplied entirely, or to a great extent, with electricity generated by peat-burning boilers. Reports show that in 1957 electric powerplants consumed 24 million tons of fuel peat,[7] 40 percent of the total produced for fuel. One large station produced 1 kwhr of electricity for each 3¼ pounds of peat burned. Large quantities of peat also are used as fuel by various local industries, converted into industrial gases, and briquetted. One-third of the total (an estimate) fuel peat is used in other industrial plants; about 10 percent is used in gas-generator plants; and 5 percent is processed into briquets.

Ireland ranked second in world production. The peat industry is highly developed in Ireland also, and large quantities are used for fuel, particularly for generating electric power. In 1946 the Irish Parliament established Bord na Mona, a statutory organization for developing Ireland's peat resources. Since then a highly mechanized peat industry has been established that currently supplies fuel for producing about one-third of the country's electric-power requirements and several hundred thousand tons of briquets annually.

---

[5] Kazakov, George. The Soviet Peat Industry. Transl. by George Adashko for Frederick A. Praeger Publishers, New York, N.Y., December 1955.

[6] Journal of the Institute of Fuel. Fuel Technology in the U.S.S.R., v. 34, No. 242, March 1961, p. 95.

[7] Strukov, B. I. K 41–oi Godovshchine Velikoy Oktyabr'skoy Sotsialisticheskoy Revolyutsii (The Peat Industry on the 41st Anniversary of the October Socialist Revolution). Torfyanaya Promyshlennost', Gosenergoizdat, Moscaw, No. 7, 1958, pp. 1–4.

Bord na Mona objectives call for the annual production of 1 million tons of sod peat and 2½ million tons of milled peat. Sod peat is used chiefly by two of the earlier power stations and for domestic and industrial heating; milled peat is used principally by the recently constructed power plants and for briquetting. Ireland also produced an estimated 13 thousand tons of fibrous moss peat for agricultural use. Virtually all was baled and exported.

West Germany produced 1.6 million tons of peat of which about one-half was used for fuel. Some peat was used for electric-power generation and substantial quantities were briquetted. The major part of the production, however, was produced for agricultural use, chiefly for export. About 6 percent of the agricultural peat was exported to the United States.

East Germany, the United States, Netherlands, Sweden, Norway, and Canada ranked next in output in the order named. Ten other countries produced minor quantities. The United States had the fifth largest output.

TABLE 13.—World production of peat by countries[1]

(Thousand short tons)

Country	1957	1958	1959	1960	1961
Argentina	(2)	2	3	[3] 3	[3] 3
Austria, fuel[3]	40	45	40	40	40
Canada, agricultural use[4]	138	150	184	185	195
Denmark	809	424	463	187	125
Finland:					
Agricultural use	2	2	1	6	[3] 6
Fuel	197	162	151	132	[3] 130
France:[3]					
Agricultural use	23	36	31	33	33
Fuel	2	6	3	2	3
Germany:					
East[3]	550	550	550	550	550
West:					
Agricultural use	780	819	931	895	[3] 830
Fuel	808	649	972	871	[3] 770
Hungary[3]	65	65	65	65	65
Ireland:					
Agricultural use	14	9	13	14	[3] 13
Fuel	4,375	2,491	4,805	4,514	[3] 4,400
Israel, agricultural use	22	[3] 28	[3] 44	[3] 50	[3] 55
Japan[3]	80	80	80	80	80
Korea, Republic of, agricultural use	269	141	99	107	[3] 110
Netherlands[3]	500	500	500	500	500
Norway:					
Agricultural use	28	[3] 33	55	42	[3] 44
Fuel	275	257	235	198	[3] 190
Poland	402	137	123	125	[3] 130
Sweden:					
Agricultural use	80	69	[3] 70	[3] 70	[3] 70
Fuel	314	281	[3] 275	[3] 275	[3] 275
U.S.S.R., fuel	60,500	58,750	66,700	59,100	[3] 60,600
United States, agricultural use	316	327	420	471	525
World total[3] [5]	70,600	66,000	76,800	68,500	69,700

[1] Includes revisions of data published previously. Data do not add to totals shown because of rounding.
[2] Less than 1,000 tons.
[3] Estimate.
[4] In addition, Canada produced a negligible quantity of peat fuel.
[5] Iceland, Italy, and Spain produced a negligible quantity of peat fuel.

Compiled by Liela S. Price, Division of Foreign Activities.

B. Petroleum and Related Products

Carbon Black

By Ivan F. Avery[1] and Lulie V. Harvey[2]

Contents

	Page		Page
General summary	301	Stocks	306
Scope of report	301	Value	307
Production	302	Foreign trade	307
Consumption and uses	303	World production	311

GENERAL SUMMARY

PRODUCTION of carbon black decreased 4 percent in 1961. Output in the major producing States of Texas and Louisiana decreased 1 percent and 8 percent, respectively. Production of channel black continued downward, declining 10 percent in 1961 compared with 9 percent in 1960. Furnace black production also decreased 3 percent from 1960. Total domestic sales, however, increased 2 percent. Sales to most major consumers increased, but sales to the ink industry decreased 10 percent. Producer's stocks decreased 5,083,000 pounds during the year. Exports decreased 4 percent.

SCOPE OF REPORT

Carbon black is a very pure grade of quasi-graphitic carbon; particle diameters range from 50 to 5,000 angstrom units.

Annual reports were submitted to the Bureau of Mines by operators of all commercial plants in the United States.

Monthly figures are based on reports prepared by the National Gas Products Association and are adjusted to agree with the annual reports received by the Bureau of Mines.

Import and export data are compiled by the Bureau of the Census, U.S. Department of Commerce.

Statistics are obtained on both furnace and channel blacks. Furnace blacks are reported in eight grades: Semireinforcing Furnace (SRF), High-Modulus Furnace (HMF), General-Purpose Furnace (GPF), Fast-Extrusion Furnace (FEF), High-Abrasion Furnace (HAF), Superabrasion Furnace (SAF), Intermediate-Abrasion

---

[1] Commodity-industry analyst, Division of Petroleum.
[2] Statistical assistant, Division of Petroleum.

Furnace (ISAF), and Thermal. Production and uses of the various grades are described in Minerals Yearbook, 1948 and 1949.

TABLE 1.—Salient statistics of carbon black produced from natural gas and liquid hydrocarbons in the United States, 1957–61

(Thousand pounds)

	1957	1958	1959	1960	1961
Production:					
Channel process	357, 557	324, 743	321, 030	292, 422	262, 507
Furnace processes	1, 440, 868	1, 319, 862	1, 646, 497	1, 761, 305	1, 717, 045
Total	1, 798, 425	1, 644, 605	1, 967, 527	2, 053, 727	1, 979, 552
Shipments:					
Domestic sales	1, 331, 366	1, 250, 937	1, 532, 249	1, 429, 618	1, 460, 005
Exports	459, 671	440, 542	513, 143	[1] 543, 047	522, 331
Total	1, 791, 037	1. 691. 479	2, 045, 392	[1] 1, 972, 665	1, 982, 336
Losses	5, 563	1, 602	4, 165	[1] 6, 973	2, 299
Stocks of producers, Dec. 31	349, 399	300, 923	218, 893	[1] 292, 982	287, 899
VALUE					
Production thousand dollars	127, 979	115, 042	137, 983	150, 774	144, 421
Average per pound cents	7. 12	7. 00	7. 01	7. 34	7. 30

[1] Revised.

PRODUCTION

Number and Capacity of Plants.—Two new furnace plants began producing in 1961, one in California and one in Texas, bringing the total number of producing plants in the United States to 44 at year's end. Total operating capacity increased to 7,034,600 pounds per day or 601,500 pounds per day more than in 1960. Total daily capacity of furnace-black plants was 6,117,300 pounds compared with a revised figure of 5,492,800 pounds in 1960. Daily capacity of channel-black plants was 917,300 pounds, declining slightly from the revised figure of 940,300 pounds in 1960.

Method and Yield.—The production of carbon black decreased 4 percent in 1961 to 1,979,552,000 pounds. Output in the major producing States of Texas and Louisiana decreased 1 percent and 8 percent, respectively, and the combined production from other States declined 3 percent.

Production of furnace black decreased 3 percent, and channel black output declined 10 percent, resulting in an overall decrease of 4 percent in 1961.

Furnace-black plants consumed 33,615 million cubic feet of natural gas as feed, producing 335,961,000 pounds of carbon black, a yield of 9.99 pounds per thousand cubic feet. Channel-black plants consumed 127,762 million cubic feet of natural gas to produce 262,507,000 pounds of carbon black, a yield of 2.05 pounds per thousand cubic feet. In addition, 307,637,000 gallons of hydrocarbon liquids was consumed, to produce 1,381,084,000 pounds of furnace black. In 1961, carbon black produced from hydrocarbon liquids amounted to 70 percent of the total production, compared with 56 percent in 1957.

TABLE 2.—Carbon black produced from natural gas and liquid hydrocarbons in the United States, 1957–61, by States and districts

(Thousand pounds)

State and district	1957	1958	1959	1960	1961	Change from 1960 (percent)
Louisiana	533, 847	502, 742	599. 523	[1] 631, 488	[1] 582. 833	−8
Texas:						
Panhandle district	544, 068	474, 564	572, 157	561. 119	524, 457	−7
Rest of State	415. 455	369, 831	450. 639	[1] 523, 737	546, 386	+4
Total Texas	959, 523	844, 395	1, 022, 796	1, 084, 856	[1] 1, 070, 843	−1
Other States	305, 055	297, 468	345, 208	337, 383	325, 876	−3
Grand total	1, 798, 425	1, 644. 605	1, 967. 537	2, 053, 727	1, 979, 552	−4

[1] Small quantity of channel black produced in Louisiana included in "Texas: Rest of State" to avoid disclosure of confidential data.

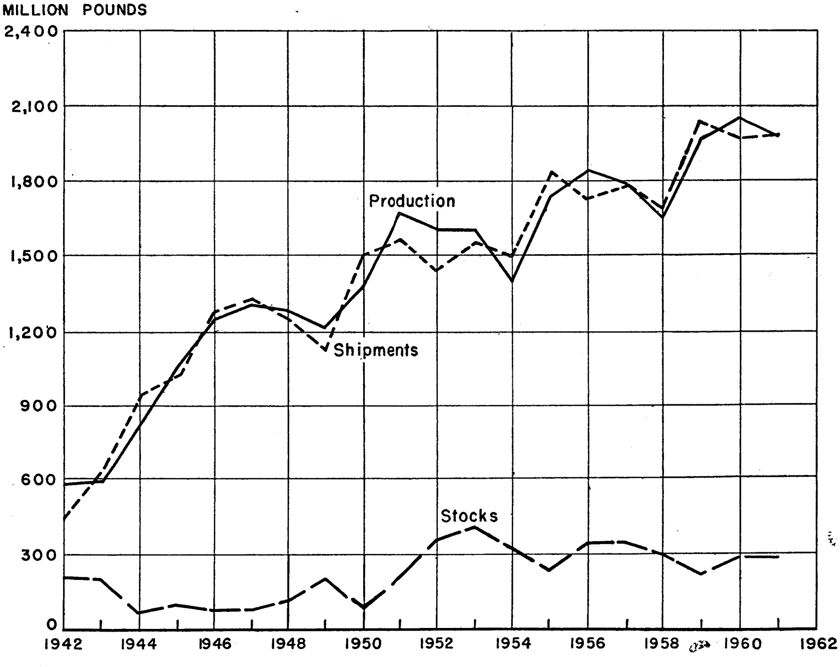

FIGURE 1.—Production, stocks, and shipments of carbon black, 1942–61.

CONSUMPTION AND USES

Domestic sales of carbon black for rubber increased slightly; for paint production increased significantly, and for ink production decreased. Miscellaneous uses increased from 6,456,000 pounds in 1960 to 18,858,000 pounds in 1961 because 8,248,000 pounds was sold to plastics and chemical industries and 4,947,000 pounds was sold to the paper industry. The rubber industry purchased 95 percent of the domestic carbon black in 1961. As a result of a continuing decrease in

TABLE 3.—Carbon black produced in the United States, 1961, by States and districts, and natural gas and liquid hydrocarbons used in its manufacture

State or district	Producers reporting[1]	Number of plants	Production					
			Furnace black			Channel black		
			Thousand pounds	Value at plant		Thousand pounds	Value at plant	
				Total (thousand dollars)	Cents per pound		Total (thousand dollars)	Cents per pound
Louisiana	6	9	582,833	37,187	6.38	(2)	(2)	(2)
Texas:								
Panhandle district	7	12	454,151	31,345	6.90	70,306	9,884	14.06
Rest of State	6	13	429,443	31,774	7.40	[2] 116,943	[2] 9,944	8.50
Total Texas	8	25	883,594	63,119	7.14	[2] 187,249	[2] 19,828	10.59
Arkansas	1	1	225,540	15,939	7.07	--------	--------	--------
Oklahoma	1	1						
California	2	2						
Kansas	2	2						
New Mexico	3	4	25,078	1,229	4.90	75,258	7,119	9.46
Grand total:								
1961	11	44	1,717,045	117,474	6.84	262,507	26,947	10.27
1960	11	42	1,761,305	121,214	6.88	292,422	29,560	10.11

State or district	Natural gas used					Liquid hydrocarbons used			
	Million cubic feet	Average yield[3] (pounds per M cubic feet)		Value		Thousand gallons	Average yield (pounds per gallon)	Value	
		Furnace	Channel	Total (thousand dollars)	Average (cents per M cu. ft.)			Total (thousand dollars)	Average (cents per gallon)
Louisiana	21,160	10.82	0.54	2,359	11.15	80,735	4.41	6,091	7.54
Texas:									
Panhandle district	42,638	8.46	1.91	4,372	10.25	93,636	4.33	6,640	7.09
Rest of State	49,945	--------	2.34	5,402	10.82	89,691	4.79	6,325	7.05
Total Texas	92,583	8.46	2.16	9,774	10.56	183,327	4.55	12,965	7.07
Arkansas	--------	--------	--------	--------	--------	43,575	4.37	2,530	5.81
Oklahoma	--------	--------	--------	--------	--------				
California	4,532	7.78	--------	1,085	23.94				
Kansas									
New Mexico	43,102	10.70	1.85	3,510	8.14	--------	--------	--------	--------
Grand total:									
1961	161,377	9.99	2.05	16,728	10.37	307,637	4.49	21,586	7.02
1960	197,628	7.45	1.93	19,853	10.05	313,020	4.52	22,054	7.05

---

[1] Detail do not add to totals because some producers operate in more than 1 area.
[2] Included with "Texas: Rest of State" to avoid disclosure of confidential data.
[3] Partly estimated.

the proportional use of natural rubber, which requires a lower loading than synthetic rubber, the average loading of carbon black in rubber rose from 857 pounds in 1960 to 897 pounds per long ton in 1961. Natural rubber comprised 28 percent of domestic consumption in 1961, compared with 31 percent in 1960. The consumption of synthetic rubber increased 1 percent; consumption of virgin rubber decreased 3 percent.

TABLE 4.—Production and shipments of carbon black in the United States in 1961, by months and grades

(Thousand pounds)

Month	Furnace									Channel	Total
	SRF [1]	HMF [2]	GPF [3]	FEF [4]	HAF [5]	SAF [6]	ISAF [7]	Thermal	Total		
PRODUCTION [8]											
January	24,511	2,922	11,815	17,018	45,559	216	26,320	12,128	140,489	25,082	165,571
February	20,024	4,415	12,045	19,137	33,571	3,031	23,833	11,566	127,622	22,660	150,282
March	24,197	5,389	12,748	16,817	43,247	1,085	29,304	12,654	145,441	23,384	168,825
April	24,412	5,802	11,049	15,967	44,227	752	26,965	9,976	139,150	22,331	161,481
May	27,134	3,367	11,553	17,332	51,488	1,905	25,305	12,814	150,898	22,785	173,683
June	23,522	3,717	9,614	20,748	40,879	3,083	25,329	11,922	138,814	21.768	160,582
July	24,287	5,416	10,165	20,396	37,254	2,986	28,800	11,553	140,857	22,117	162,974
August	22,977	5,788	12,646	20,527	36,981	1,171	31,164	12,718	143,972	22,338	166,310
September	21,568	5,299	11,041	17,244	41,605	3,113	27,155	9,529	136,554	21,380	157,934
October	22,928	5,501	13,696	19,004	43,252	1,196	28,103	11,836	145,516	21,445	166,961
November	25,089	3,984	11,376	19,969	46,300	356	29,968	13,532	150,574	18,299	168,873
December	25,931	5,750	13,765	19,889	47,513	1,037	28,804	14,469	157,158	18,918	176,076
Total	286,580	57,350	141,513	224,048	511,876	19,931	331,050	144,697	1,717,045	262,507	1,979,552
SHIPMENTS (INCLUDING EXPORTS) [9]											
January	21,922	4,578	11,778	17,833	39,319	1,397	25,308	12,215	134,350	23,621	157,971
February	22,172	5,233	10,801	16,733	38,866	985	22,242	10,533	127,565	22,856	150,421
March	24,795	5,470	12,604	17,662	40,666	1,481	26,794	12,148	141,620	23,822	165,442
April	21,865	4,246	9,976	16,418	36,499	1,109	20,476	10,507	121,096	21,479	142,575
May	25.317	4,677	10,992	19,100	49,370	876	25,533	13,086	148,951	24,939	173,890
June	22,478	4,744	10,828	17,990	40,899	1,064	23,755	12,061	133,819	23,568	157,387
July	22,625	5,027	11,185	18,252	40,788	2,040	28,114	10,418	138,449	22,054	160,503
August	24,236	4,804	12,095	19,699	41,810	1,613	26,804	14,523	145,584	23,838	169,422
September	25,348	5,715	11,970	18,756	43,959	1,882	26,516	13,703	147,849	25,642	173,491
October	27,412	5,156	13,818	21,349	43,434	1,220	27,328	14,610	154,327	25,356	179,683
November	26,761	5,201	12,636	22,114	47,547	865	27,805	14,169	157,098	23,922	181,020
December	23,880	5,845	12,602	19,493	45,245	1,326	26,722	13,527	148,640	24,190	172,830
Total	288,811	60,696	141,285	225,399	508,402	15,858	307,397	151,500	1,699,348	285,287	1,984,635

[1] Semireinforcing Furnace.
[2] High-Modulus Furnace.
[3] General-Purpose Furnace.
[4] Fast-Extrusion Furnace.
[5] High-Abrasion Furnace.
[6] Superabrasion Furnace.
[7] Intermediate-Abrasion Furnace.
[8] Compiled from reports of the National Gas Products Association and of producing companies not included in Association figures. Figures adjusted to agree with annual reports of individual producers.
[9] Includes losses.

TABLE 5.—Natural gas and liquid hydrocarbons used in manufacturing carbon black in the United States and average yield, 1957–61

	1957	1958	1959	1960	1961
Natural gas used .... million cubic feet..	233,788	211,048	214,612	197,628	161,377
Average yield of carbon black per thousand cubic feet .... pounds..	3.40	3.32	3.31	3.23	3.71
Average value of natural gas used per thousand cubic feet .... cents..	8.26	8.44	9.19	10.05	10.37
Liquid hydrocarbons used .... thousand gallons..	240,413	231,057	297,639	313,020	307,637
Average yield of carbon black per gallon pounds..	4.18	4.09	4.22	4.52	4.49
Average value of liquid hydrocarbons used per gallon .... cents..	7.36	6.79	6.74	7.05	7.02
Number of producers reporting	12	11	11	11	11
Number of plants	42	41	41	42	44

TABLE 6.—Number and capacity of carbon black plants operated in the United States, 1960–61

State or district	County or parish	Number of plants				Total daily capacity (pounds)	
		1960		1961		1960	1961
		Channel	Furnace	Channel	Furnace		
Texas: Panhandle district	Carson	1		1		1,836,500	1,721,500
	Gray	3	1	3	1		
	Hutchinson	1	4	1	4		
	Moore		1		1		
	Wheeler		1		1		
Total Panhandle district		5	7	5	7	1,836,500	1,721,500
Rest of State	Aransas	1	1	1	1	1,627,300	2,143,800
	Brazoria	1		1			
	Brooks	1		1			
	Ector	1		1			
	Gaines	1		1			
	Harris		1		1		
	Howard		1		2		
	Montgomery		1		1		
	Orange		1		1		
	Terry		1		1		
	Winkler	1		1			
Total rest of State		6	6	6	7	1,627,300	2,143,800
Total Texas		11	13	11	14	3,463,800	3,865,300
Louisiana	Avoyelles		1		1	1,795,300	1,840,300
	Calcasieu		1		1		
	Evangeline		1		1		
	Ouachita		2		2		
	Richland	1		1			
	St. Mary		3		3		
Total Louisiana		1	8	1	8	1,795,300	1,840,300
Arkansas	Union		1		1	842,000	1,010,000
California	Contra Costa		1		1		
	Kern				1		
Kansas	Grant		2		2		
Oklahoma	Kay		1		1		
New Mexico	Lea	3	1	3	1	332,000	319,000
Total United States		15	27	15	29	6,433,100	7,034,600

TABLE 7.—Sales of carbon black for domestic consumption in the United States, 1957–61, by uses

(Thousand pounds)

Use	1957	1958	1959	1960	1961	Change from 1960 (percent)
Rubber	1,271,562	1,192,162	1,463,239	1,362,912	1,382,893	+1
Ink	43,153	40,645	47,366	47,980	42,987	−10
Paint	11,951	10,997	13,828	12,270	15,267	+24
Miscellaneous	4,700	7,133	7,816	6,456	18,858	+192
Total	1,331,366	1,250,937	1,532,249	1,429,618	1,460,005	+2

STOCKS

Total stocks of carbon black decreased 5,083,000 pounds in 1961. Furnace black increased 17,697,000 pounds, but stocks of channel black decreased 22,780 pounds during 1961.

VALUE

The Oil, Paint and Drug Reporter, on April 10, 1961, reported a price rise of 2 cents per pound in carload lots in bags for High-Modulus Furnace, reverting to the 1960 price on October 9, 1961. At the same time Fast-Extrusion Furnace also decreased 2 cents per pound to the 1960 price. The average value at plants of furnace black decreased slightly to 7.84 cents per pound; the average value of channel black increased slightly to 10.27 cents per pound. The average value of natural gas used as feed stock rose 0.32 cent per M c.f. to 10.37 cents. The average value of liquid hydrocarbons used remained substantially unchanged at 7.02 cents per gallon.

TABLE 8.—Producers' stocks of channel- and furnace-type blacks in the United States, December 31, 1957–61

(Thousand pounds)

Year	Furnace									Channel	Total
	SRF[1]	HMF[1]	GPF[1]	FEF[1]	HAF[1]	SAF[1]	ISAF[1]	Thermal	Total		
1957	75, 282	10, 704	1, 632	35, 135	60, 242	6, 241	49, 877	28, 270	267, 383	82, 016	349, 399
1958	40, 391	6, 351	8, 867	26, 526	53, 007	7, 045	40, 451	23, 276	205, 914	95, 009	300, 923
1959	24, 917	4, 757	4, 132	18, 413	40, 281	6, 786	29, 044	20, 800	149, 130	69, 763	218, 893
1960	43, 402	12, 050	7, 827	23, 420	66, 325	4, 437	39, 075	23, 032	219, 568	73, 424	292. 992
1960[2]	43, 402	11, 040	8, 827	23, 420	66, 325	4. 437	39, 075	23, 032	219, 558	73, 424	292. 982
1961	41, 171	7, 694	9, 055	22, 069	69, 799	8. 510	62, 728	16, 229	237, 255	50, 644	287, 899

[1] For explanation, see footnotes to table 4.
[2] Reclassification of grades.

TABLE 9.—Prices of carbon black in carlots, f.o.b. plant, 1957–61

(Cents per pound)

Date	Channel blacks		Furnace blacks			
	Ordinary rubber grades[1]		Semi-reinforcing grades (SRF)	High-Modulus grades (HMF)	Fast Extrusion grades (FEF)	High-Abrasion grades (HAF)
	Bags	Bulk	Bags	Bags	Bags	Bags
Jan. 1, 1957	7. 40	7. 00	4. 50	5. 50	6. 00	7. 90
Dec. 9, 1957	7. 75	7. 25	4. 50	6. 25	6. 75	7. 75
Dec. 29, 1958	7. 75	7. 25	5. 75	6. 25	6. 75	7. 75
Dec. 28, 1959	7. 75	7. 25	5. 75	6. 25	6. 75	7. 75
Feb. 8, 1960	8. 50	8. 00	5. 75	6. 25	6. 75	7. 75
Oct. 17, 1960	8. 50	8. 00	5. 75	6. 25	8. 75	7. 75
Apr. 10, 1961	8. 50	8. 00	5. 75	8. 25	8. 75	7. 75
Oct. 9, 1961	8. 50	8. 00	5. 75	6. 25	6. 75	7. 75

[1] Chiefly Easy-Processing (EPC) and Medium-Processing (MPC), but also includes Hard-Processing (HPC) and Conductive (CC) channel blacks.

Source: Oil Paint and Drug Reporter.

FOREIGN TRADE[3]

Imports.—Imports of acetylene black in 1961 amounted to 8,074,000 pounds, compared with 6,785,000 pounds in 1960. All the acetylene black was imported from Canada. The average value reported by the Census Bureau was 18.4 cents per pound, compared with 19.2 cents per pound in 1960. Other carbon black imports decreased from 719,000 pounds in 1960 to 557,000 pounds in 1961. Virtually all came from Canada.

---

[3] Figures on exports compiled by Mae B. Price and Elsie D. Jackson, Bureau of Mines, from records of the U.S. Department of Commerce.

Exports.—Exports of carbon black decreased 20,716,000 pounds, 4 percent, in 1961. Furnace black decreased 16,385,000 pounds, and channel black declined by 4,316,000 pounds in 1961. Large decreases were reported in shipments to Canada, France, Italy, and Australia in 1961, whereas shipments to South American countries increased 6,520 thousand pounds.

TABLE 10.—Carbon black exported from the United States, in 1961, by months

(Thousand pounds)

Month	Channel	Furnace	Total	Month	Channel	Furnace	Total
January	10, 598	29, 965	40, 563	September	10, 815	27, 367	38, 182
February	11, 989	27, 614	39, 603	October	15, 243	33, 247	48, 490
March	11, 738	41, 213	52, 951	November	10, 111	34, 706	44, 817
April	10, 619	37, 056	47, 675	December	12, 452	30, 924	43, 376
May	11, 967	29, 143	41, 110				
June	14, 516	35, 186	49, 702	Total: 1961	141, 750	380, 581	522, 331
July	9, 586	29, 350	38, 936	1960	146, 066	[1] 396, 981	[1] 543, 047
August	12, 116	24, 810	36, 926				

[1] Revised figure. Table 11, page 313, 1960 minerals yearbook should read as follows: April: Furnace 41, 382; total 55, 244.

Source: Bureau of the Census.

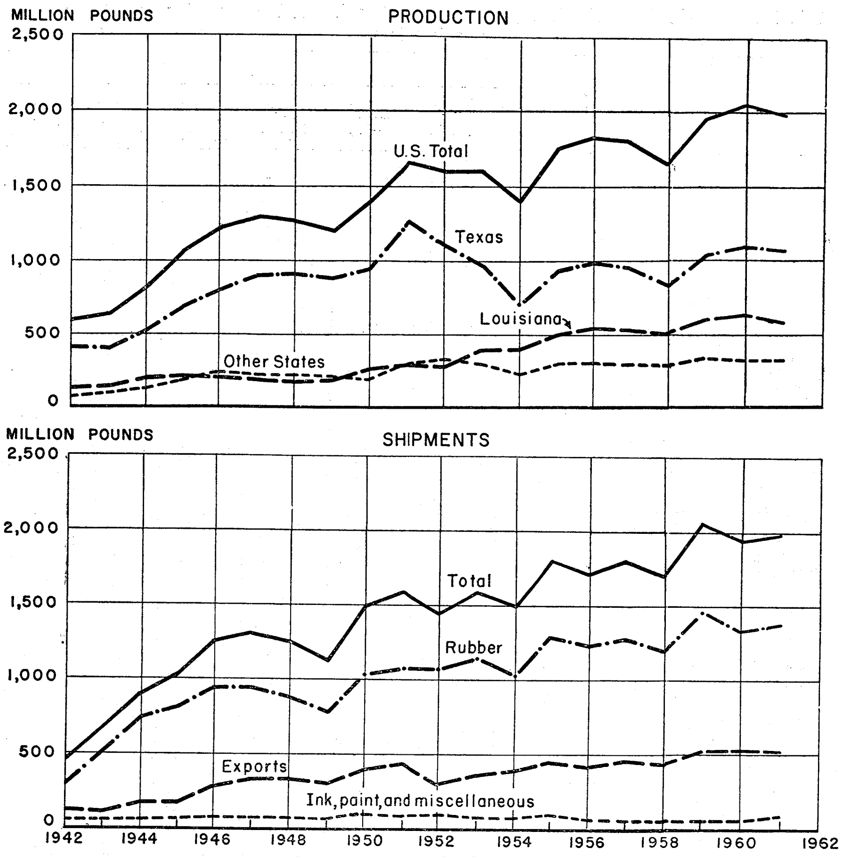

FIGURE 2.—Production and shipments of carbon black, 1942–61.

TABLE 11.—Carbon black exported from the United States, by countries of destination

Country	1959		1960		1961	
	Thousand pounds	Thousand dollars	Thousand pounds	Thousand dollars	Thousand pounds	Thousand dollars
North America:						
Canada	38,936	$3,231	27,174	$2,285	19,722	$1,712
Cuba	3,697	305	2,003	164	------	------
Guatemala	379	34	826	75	815	71
Mexico	19,420	1,583	20,571	1,728	20,273	1,652
Other North America	87	7	124	10	72	10
Total	62,519	5,160	50,698	4,262	40,882	3,445
South America:						
Argentina	20,295	1,780	20,183	1,768	29,798	2,634
Brazil	13,076	1,073	12,930	1,085	12,021	1,011
Chile	3,532	308	3,554	313	3,361	299
Colombia	5,855	532	8,769	772	8,057	721
Peru	3,041	278	3,928	356	3,858	344
Uruguay	1,422	122	3,667	307	1,227	105
Venezuela	9,571	859	10,020	906	11,100	1,006
Other South America	347	28	315	37	464	46
Total	57,139	4,980	63,366	5,544	69,886	6,166
Europe:						
Austria	1,719	120	1,457	119	2,032	157
Belgium-Luxembourg	16,035	1,443	13,326	1,222	12,899	1,173
Czechoslovakia	60	6	352	38	1,091	101
Denmark	1,446	178	3,229	315	3,552	323
Finland	1,273	104	738	73	1,329	118
France	70,969	6,379	67,981	6,278	55,215	5,242
Germany, West	29,743	2,549	44,503	3,790	51,184	4,331
Greece	410	36	267	26	505	43
Ireland	97	15	101	22	25	3
Italy	52,627	4,539	71,336	6,348	65,528	5,887
Netherlands	10,334	989	9,950	1,058	8,246	818
Norway	1,965	175	1,852	162	2,076	187
Poland and Danzig	198	16	1,004	84	13	2
Portugal	2,630	216	1,974	171	2,290	211
Spain	10,248	935	[1] 9,645	[1] 855	8,189	735
Sweden	17,325	1,492	14,544	1,320	10,693	1,005
Switzerland	4,302	481	1,751	190	3,554	347
Trieste	45	3	------	------	198	15
U.S.S.R	275	26	4,496	404	9,370	828
United Kingdom	27,187	3,170	29,228	3,563	26,155	3,361
Yugoslavia	2,633	248	3,284	315	4,664	414
Other Europe	12	2	65	18	45	4
Total	251,533	23,122	[1] 281,083	[1] 26,371	268,853	25,305
Asia:						
India	17,785	1,469	22,941	1,939	31,400	2,669
Indonesia	8,252	739	6,605	584	7,143	649
Iran	------	------	301	26	1,635	142
Israel	5,911	496	4,913	426	4,738	395
Japan	37,855	3,621	47,537	4,650	41,574	4,325
Korea, Republic of	4,252	439	2,386	229	2,873	272
Malaya, Federation of	631	56	1,026	96	1,248	116
Singapore	370	36	544	51	534	50
Pakistan	482	44	643	62	705	66
Philippines	6,192	550	8,194	755	7,587	695
Taiwan	1,349	130	1,353	129	1,407	126
Turkey	2,234	190	1,632	139	1,305	112
Other Asia	1,456	130	2,018	194	2,733	280
Total	86,769	7,900	100,093	9,280	104,882	9,897
Africa:						
Union of South Africa	26,299	2,321	24,081	2,147	20,812	1,840
United Arab Republic (Egypt region)	711	54	1,631	133	2,303	205
Other Africa	582	53	841	77	873	84
Total	27,592	2,428	26,553	2,357	23,988	2,129
Oceania:						
Australia	22,973	1,797	16,581	1,376	8,473	750
New Zealand	4,618	411	4,673	412	5,367	474
Total	27,591	2,208	21,254	1,788	13,840	1,224
Grand total	513,143	45,798	[1] 543,047	[1] 49,602	522,331	48,166

[1] Revised figure.

Source: Bureau of the Census.

WORLD PRODUCTION

TABLE 12.—World production of carbon black, 1957–61, by countries [1] [2]

(Thousand pounds)

Country [1]	1957	1958	1959	1960	1961
Brazil	-----------	18,739	25,353	35,274	(3)
France	8,818	39,700	68,800	[4] 77,000	[4] 143,300
Germany, West	149,670	141,429	139,582	154,856	(3)
Italy	3,968	4,015	4,627	(3)	(3)
Japan	30,611	31,662	42,300	55,093	92,245
Rumania	42,044	49,116	49,235	55,186	(3)
South Africa	-----------	-----------	-----------	-----------	4,123
Sweden	-----------	6,027	7,430	(3)	(3)
Taiwan	680	(3)	(3)	(3)	(3)
United Kingdom	234,035	243,936	269,069	320,317	301,054
United States	1,798,425	1,644,605	1,967,527	2,053,727	1,979,552
Yugoslavia	4,242	4,934	6,440	8,514	9,696

[1] China, India, Mexico, and Netherlands produce carbon black but production data are not available. Canada's carbon black capacity was increased late in 1961 to about 100 million pounds annually, from two producers. Actual production is not published to avoid disclosure of individual company data.

[2] This table incorporates some revisions.

[3] Data not available.

[4] Estimate.

Compiled by Liela S. Price, Division of Foreign Activities.

Natural Gas

By Ivan F. Avery[1] and Lulie V. Harvey[2]

◆

Contents

	Page		Page
General summary	313	Interstate shipments, imports and exports	326
Scope of report	314	Pipelines	326
Reserves	314	Consumption	327
Gross withdrawal	314	Value and price	330
Underground storage of natural gas	314	World production	331

GENERAL SUMMARY

MARKETED production of natural gas increased 4 percent to 13,254 billion cubic feet. The average value at the wellhead was 15.1 cents per thousand cubic feet, an increase of 1.1 cents per thousand over 1960.

Natural gas was consumed in all States except Maine, Vermont, and Hawaii. Total consumption was 13,082 billion cubic feet, an increase of 5 percent over 1960. The average value at point of consumption increased 0.9 cent to 51.0 cents per thousand cubic feet, compared to an increase of 2.4 cents per thousand in 1960.

TABLE 1.—Salient statistics of natural gas in the United States

	1957	1958	1959	1960	1961
Supply:					
Marketed production[1] million cubic feet	10,680,258	[2] 11,030,298	12,046,115	12,771,038	13,254,025
Withdrawn from storage do	480,981	621,091	668,743	712,658	698,050
Imports do	37,941	135,797	133,990	155,646	218,860
Total do	11,199,180	11,787,186	12,848,848	13,639,342	14,170,935
Disposition:					
Consumption do	10,279,775	[2] 10,760,698	11,819,638	12,509,427	13,081,714
Exports do	41,655	38,719	18,413	11,332	10,747
Stored do	672,377	704,172	787,485	844,352	843,666
Lost in transmission, etc do	205,373	283,597	223,312	274,231	234,808
Total do	11,199,180	11,787,186	12,848,848	13,639,342	14,170,935
Value at wellhead:					
Total thousand dollars	1,201,759	[2] 1,317,492	1,556,800	1,789,970	1,996,241
Average cents per thousand cubic feet	11.3	11.9	12.9	14.0	15.1

[1] Comprises gas sold or consumed by producers, including losses in transmission, amounts added to storage, and increases in gas in pipelines.

[2] Includes 50 million cubic feet produced in Alaska with a value of $6,000.

---

[1] Commodity-industry analyst.

[2] Statistical assistant.

SCOPE OF REPORT

Data on natural gas production, consumption, and value are collected by annual questionnaires sent to oil and gas producers, natural-gasoline-plant operators, gas-pipeline companies, and gas-utility companies. A separate report was filed by the respondent for each State in which he operated.

Volumes are reported at the pressure base selected by the reporting company; however, if the reported pressure base deviates more than 5 percent from 14.65 pounds per square inch absolute at 60° F, it is corrected to this base.

Reports are received covering approximately 75 percent of the gross natural gas production. The large number of respondents and the difficulty of contacting each small producer make direct compilation of total production impractical. The bulk of output of non-reporting producers is shown in purchase listings of reporting companies. Marketed production for each State equals consumption in the State, plus gas placed in storage, plus shipments to other States, less gas withdrawn from storage, less receipts from other States.

RESERVES

At the end of 1961, proved reserves of natural gas were found to be 267.7 trillion cubic feet, according to the American Gas Association Committee on Natural Gas Reserves. This was an increase of 3.9 trillion cubic feet during the year. Nonassociated gas comprised 72 percent, associated gas 16 percent, and dissolved gas and gas in underground storage comprised the remaining 12 percent of reserves.

GROSS WITHDRAWAL

Gross withdrawal is the sum of marketed production, gas repressured, and vent and waste. Gross withdrawal was 15,460 billion cubic feet, 2 percent more than the 15,088 billion cubic feet withdrawn in 1960. The quantity of gas vented and wasted is compiled from data given on the reporting forms, supplemented by estimated waste derived from figures published by the Natural Gas Reserves Committee of the American Gas Association and State conservation bodies. This quantity decreased 7 percent in 1961 to 524 billion cubic feet. Repressuring also decreased from 1,754 billion cubic feet in 1960 to 1,683 billion in 1961.

UNDERGROUND STORAGE OF NATURAL GAS

The American Gas Association reports that 12 storage pools and 538 no-longer-producing wells were added to existing underground storage facilities, bringing the total of such facilities to 229 storage pools and 9,617 wells. Total capacity of underground natural gas storage facilities is now 3.1 trillion cubic feet and the underground storage facilities now exist in 21 states.

Gross injections to underground storage in 1961 were 844 billion cubic feet, and withdrawals were 698 billion cubic feet. Storage reservoirs as of December 31 were filled to 75 percent of capacity.

TABLE 2.—Estimated proved recoverable reserves of natural gas in the United States

(Million cubic feet)

State	Reserves as of Dec. 31, 1960 [1]	Changes in reserves during 1961			
		Extensions and revisions [1]	Discoveries of new fields and new pools in old fields [1]	Net change in underground storage [2]	Net production [3]
Alaska	107,663	757,817	63,000	0	1,651
Arkansas	1,459,710	68,361	13,143	−114	64,108
California [4]	8,843,895	517,590	268,086	13,103	539,061
Colorado	2,042,754	166,884	56,049	491	95,462
Illinois	173,135	−309	395	6,387	15,423
Indiana	34,120	2,135	30	−261	3,751
Kansas	19,620,224	164,534	103,759	−1,682	696,830
Kentucky	1,143,849	37,017	7,028	10,308	71,424
Louisiana [4]	63,386,141	3,742,563	2,233,390	0	3,333,424
Michigan	585,758	55,736	24,535	27,820	27,185
Mississippi	2,542,338	299,635	187,003	−266	180,721
Montana	626.178	735	6,666	−1,289	35,953
Nebraska	117,828	−2,295	604	0	11,855
New Mexico	15,603,724	−149,779	50,475	−2,281	744,400
New York	96,201	3,229	1,820	31,334	4,260
North Dakota	1,151,021	−179,659	0	0	22,831
Ohio	765,553	−26,995	7,000	27,220	38,941
Oklahoma	17,311,402	610,324	448,779	−3,096	1,016,485
Pennsylvania	1,192,480	48,571	24,520	1,602	98.318
Texas [4]	119,489,393	3,138,993	3,141,250	−630	5,930,295
Utah	1,526,140	467,061	92,739	503	56,283
Virginia	33,290	3,132	0	0	2,360
West Virginia	1,831,125	259,764	80,688	30,248	182,823
Wyoming	3,934,749	328,225	134,465	257	270,648
Other States [5]	140,129	1,443	26	20,760	7,213
Total	263,758,800	10,314,712	6,945,450	160,414	13,451,705

State	Reserves as of December 31, 1961				
	Non-associated [6]	Associated [7]	Dissolved [8]	Underground storage [9]	Total
Alaska	858,237	0	68,592	0	926,829
Arkansas	991,854	280,572	199,638	4,928	1,476,992
California [4]	2,868,392	1,920,179	4,180,046	134,996	9.103,613
Colorado	1,791,337	98,402	279,757	1,220	2,170,716
Illinois	4,939	0	100,258	58,988	164,185
Indiana	920	1,060	18.609	11,684	32,273
Kansas	18,401,590	499,423	208,106	80,886	19,190,005
Kentucky	1,016,244	0	74,115	36,419	1,126,778
Louisiana [4]	53,579,658	8,533,218	3,915,794	0	66,028,670
Michigan	138,966	87,846	70,716	369,136	666,664
Mississippi	2,276,104	263,781	302,905	5,199	2,847,989
Montana	437,554	26,832	78,057	53,894	596,337
Nebraska	83,772	7,451	13,059	0	104,282
New Mexico	10,695,891	2,395,501	1,624,204	42,143	14,757,739
New York	37,664	0	104	90,556	128,324
North Dakota	8,865	153,657	786,009	0	948,531
Ohio	272,690	0	84,612	376,535	733,837
Oklahoma	12,622,722	2,195,742	2,416,656	115,804	17,350,924
Pennsylvania	691,114	0	21,540	456,201	1,168,855
Texas [4]	78,435,761	26,791,530	14,550,999	60,421	119,838,711
Utah	1,368,552	144,255	516,850	503	2,030.160
Virginia	34,062	0	0	0	34,062
West Virginia	1,630,826	0	62,633	325,543	2,019,002
Wyoming	3,418,453	161,091	525,675	21,829	4,127,048
Other States [5]	44,407	0	13,205	97,533	155,145
Total	191,710,574	43,560,540	30,112,139	2,344,418	267,727,671

---

[1] Excludes gas loss due to natural gas liquids recovery.

[2] New difference between gas stored in and gas withdrawn from underground storage reservoirs, including adjustments and native gas transferred from other reserves categories.

[3] Net production equals gross withdrawals less gas injected into producing reservoirs. Changes in underground storage and gas loss due to natural gas liquids recovery are excluded. Fourth quarter production estimated in some instances.

[4] Includes offshore reserves.

[5] Includes Alabama, Arizona, Florida, Iowa, Maryland, and Missouri.

[6] Free gas not in contact with crude oil in reservoirs and free gas in contact with oil, when production of such gas is not significantly affected by production of crude oil.

[7] Free gas in contact with crude oil in reservoir where production of such gas is significantly affected by production of crude oil.

[8] Gas in solution with crude oil in reservoirs.

[9] Gas held in underground reservoirs (including native and net-injected gas) for storage purposes.

Source: Committee on Natural Gas Reserves, American Gas Association.

TABLE 3.—Gross withdrawals and disposition of natural gas in the United States

(Million cubic feet)

State	Gross withdrawals [1]			Disposition		
	From gas wells	From oil wells	Total	Marketed production [2]	Repressuring	Vented and waste [3]
1960:						
Arkansas	45, 700	41, 100	86, 800	55, 451	27, 640	3, 709
California	182, 000	647, 300	829, 300	517, 535	308, 916	2, 849
Colorado	52, 700	99, 200	151, 900	107, 404	38, 465	6, 031
Illinois	2, 400	17, 300	19, 700	11, 666	145	7, 889
Indiana	300	3, 600	3. 900	342	------------	3, 558
Kansas	617, 000	58, 000	675, 000	634, 410	440	40, 150
Kentucky	72, 900	3, 000	75, 900	75, 329	------------	571
Louisiana	2, 691, 000	622, 000	3, 313, 000	2, 988, 414	219, 441	105, 145
Maryland	4, 065	------------	4, 065	4, 065	------------	------------
Michigan	18, 900	8, 000	26, 900	20, 790	2, 087	4, 023
Mississippi	150, 700	99, 000	249, 700	172, 478	62, 199	15, 023
Montana	29, 700	8, 300	38, 000	33, 418	1, 038	3, 544
Nebraska	8, 300	9, 000	17, 300	15, 258	91	1, 951
New Mexico	532, 300	288, 700	821, 000	798, 928	9, 359	12, 713
New York	4, 900	200	5, 100	4, 990	------------	110
North Dakota	1, 000	23, 800	24, 800	19, 483	2, 486	2, 831
Ohio	34, 400	5, 000	39, 400	36, 074	65	3, 261
Oklahoma	639, 400	494, 000	1, 133, 400	824, 266	115, 467	193, 667
Pennsylvania	116, 400	3, 500	119, 900	113, 928	156	5, 816
Texas	5, 307, 600	1, 657, 300	6, 964, 900	5, 892, 704	941, 004	131, 192
Utah	15, 500	46, 700	62. 200	51, 040	5, 826	5, 334
Virginia	2, 227	------------	2, 227	2, 227	------------	------------
West Virginia	205, 900	3, 200	209, 100	208, 757	26	317
Wyoming	117, 800	96, 000	213, 800	181, 610	19, 145	13, 045
Other States [4]	334	285	619	471	------------	148
Total	10, 853, 426	4, 234, 485	15, 087, 911	12, 771, 038	1, 753, 996	562, 877
1961:						
Arkansas	45, 800	42, 100	87, 900	59, 547	25, 748	2, 605
California	214, 000	653, 000	867, 000	556, 241	298, 209	12, 550
Colorado	58, 800	86, 600	145, 400	108, 142	32, 129	5, 129
Illinois	2, 000	14, 200	16, 200	9, 970	------------	6, 230
Indiana	300	3, 400	3, 700	382	------------	3, 318
Kansas	639, 900	57, 500	697, 400	649, 083	617	47, 700
Kentucky	68, 900	3, 500	72, 400	70, 937	------------	1, 463
Louisiana	2, 930, 100	640, 700	3, 570, 800	3, 271, 857	201, 989	96, 954
Maryland	3, 578	------------	3, 578	3, 578	------------	------------
Michigan	20, 000	12, 200	32, 200	27, 697	4, 023	480
Mississippi	136, 800	99, 500	236, 300	172, 543	54, 180	9, 577
Montana	28. 700	8, 300	37, 000	33, 901	302	2, 797
Nebraska	8, 600	8. 300	16, 900	15, 743	101	1, 056
New Mexico	515, 600	290, 700	806, 300	789, 662	7, 025	9, 613
New York	5, 600	200	5, 800	5, 742	------------	58
North Dakota	1, 000	26, 300	27, 300	20, 100	2, 187	5, 013
Ohio	33, 900	5, 100	39, 000	36, 423	65	2, 512
Oklahoma	667, 600	492, 000	1, 159, 600	892, 697	97, 613	169, 290
Pennsylvania	100, 200	3, 300	103, 500	100, 427	42	3, 031
Texas	5, 353. 000	1, 667, 100	7, 020, 100	5, 963, 605	930, 984	125, 511
Utah	17, 500	52, 500	70, 000	57, 175	10, 233	2, 592
Virginia	2, 466	------------	2, 466	2, 466	------------	------------
West Virginia	207, 400	3, 300	210, 700	210, 556	80	64
Wyoming	132, 800	94, 000	226, 800	194, 674	17, 227	14, 899
Other States [4]	543	1, 425	1, 968	877	------------	1, 091
Total	11, 195, 087	4, 265, 225	15, 460, 312	13, 254, 025	1, 682, 754	523, 533

---

[1] Marketed production plus quantities used in repressuring, vented, and wasted.

[2] Comprises gas sold or consumed by producers, including losses in transmission, quantities added to storage, and increases in gas pipelines.

[3] Partly estimated: Includes direct waste on producing properties and residue blown to the air.

[4] Alabama, Alaska, Arizona, Florida, Missouri, South Dakota, and Tennessee.

TABLE 4.—Marketed production of natural gas in the United States [1]

State	Quantity (million cubic feet)					Change from 1960 (percent)	Estimated value at wells (thousand dollars)	
	1957	1958	1959	1960	1961		1960	1961
Alabama	190	323	172	57	56	−1.2	4	4
Alaska	----------	50	133	246	631	156.5	30	129
Arkansas	31,327	32,890	40,674	55,451	59,547	7.4	6,599	8,039
California	492,338	465,582	485,655	517,535	556,241	7.5	138,182	157,416
Colorado	95,259	82,464	99,899	107,404	108,142	0.7	12,781	12,544
Florida	34	35	34	30	29	−3.3	5	5
Illinois	9,647	12,983	13,739	11,666	9,970	−14.5	1,458	1,276
Indiana	671	378	484	342	382	11.7	61	77
Kansas	586,690	561,816	604,410	634,410	649,083	2.3	74,226	81,135
Kentucky	70,024	72,248	73,504	75,329	70,937	−5.8	18,380	17,592
Louisiana	2,078,901	2,451,587	2,670,271	2,988,414	3,271,857	9.5	511,019	611,837
Maryland	4,649	4,266	4,373	4,065	3,578	−12.0	1,081	973
Michigan	9,122	14,243	18,916	20,790	27,697	33.2	4,449	5,844
Mississippi	169,967	160,143	162,095	172,478	172,543	----------	32,426	32,093
Missouri	12	----------	----------	75	90	20.0	19	22
Montana	28,638	27,989	30,743	33,418	33,901	1.4	2,373	2,509
Nebraska	14,249	11,405	13,128	15,258	15,743	3.2	2,670	2,629
New Mexico	723,004	761,446	739,660	798,928	789,662	−1.2	85,485	86,073
New York	2,869	2,808	2,915	4,990	5,742	15.1	1,542	1,694
North Dakota	15,450	17,325	17,915	19,483	20.100	3.2	2,221	2,533
Ohio	30,384	31,786	34,664	36,074	36,423	1.0	8,477	9,069
Oklahoma	719,794	696,504	811,508	824,266	892,697	8.3	98,088	108,016
Pennsylvania	101,801	95,869	99,366	113,928	100,427	−11.9	36,229	29,526
Tennessee	38	54	52	63	71	12.7	11	13
Texas	5,156,215	5,178,073	5,718,993	5,892,704	5,963,605	1.2	665,876	733,523
Utah	16,824	19,247	38,921	51,040	57,175	11.0	9,187	8,976
Virginia	2,465	2,521	2,280	2,227	2,466	10.7	604	668
West Virginia	202,440	204,581	204,633	208,757	210,556	0.9	54,694	57,692
Wyoming	117,256	121,682	156,978	181,610	194,674	7.2	21,793	24,334
Total	10,680,258	11,030,298	12,046,115	12,771,038	13,254,025	3.8	1,789,970	1,996,241

[1] Comprises gas either sold or consumed by producers, including losses in transmission, quantities added to storage and increases of gas in pipelines.

TABLE 5.—Natural gas stored underground in and withdrawn from storage fields

(Million cubic feet)

States	1960			1961		
	Total stored	Total withdrawn	Net stored	Total stored	Total withdrawn	Net stored
Arkansas	2,076	278	1,798	1,219	644	575
California	46,753	36,035	10,718	30,812	38,015	−7,203
Colorado	----------	----------	----------	1,146	648	498
Delaware	341	----------	341	----------	----------	----------
Illinois	21,419	15,756	5,663	23,913	17,295	6,618
Indiana	10,219	8,186	2,033	10,203	8,356	1,847
Iowa	31,423	12,494	18,929	33,244	16,863	16,381
Kansas	38,808	31,333	7,475	43,000	33,651	9,349
Kentucky	13,871	15,004	−1,133	17,218	13,578	3,640
Michigan	130,814	119,273	11,541	131,234	110,457	20,777
Mississippi	3,018	3,552	−534	4,290	4,051	239
Missouri	5,690	3,831	1,859	7,471	3,108	4,363
Montana	9,574	2,601	6,973	7,281	3,424	3,857
New Mexico	3,824	6,175	−2,351	4,861	5,919	−1,058
New York	23,879	29,373	−5,494	35,574	37,276	−1,702
Ohio	120,622	102 846	17,776	116,565	96,434	20,131
Oklahoma	23,834	23,032	802	23,779	18,254	5,525
Pennsylvania	177,491	149,128	28,363	183,563	157,667	25,896
Texas	23,362	22,101	1,261	24,044	15,540	8,504
Utah	44	13	31	918	459	459
Virginia	19	----------	19	----------	----------	----------
West Virginia	153,748	128,600	25,148	141,095	113,742	27,353
Wyoming	3,523	3,047	476	2,236	2,669	−433
Total	844,352	712,658	131,694	843,666	698,050	145,616

TABLE 6.—Underground storage statistics, Dec. 31, 1961

State	Number of pools	Number of active wells	Total gas in storage reservoirs (million cubic feet)	Total reservoir capacity (million cubic feet)
Arkansas	2	17	4, 928	5, 204
California	6	141	134, 996	265, 163
Colorado	2	12	1, 220	1, 220
Illinois	6	127	58, 988	58, 988
Indiana	7	304	11, 684	13, 356
Iowa	2	104	82. 175	140, 000
Kansas	16	739	80, 886	101, 950
Kentucky	6	419	36, 419	32, 160
Michigan	20	1, 429	369, 136	469. 138
Mississippi	2	31	5, 199	6, 158
Missouri	2	45	15, 358	60, 000
Montana	4	108	53, 894	93, 974
New Mexico	4	57	42, 143	77, 871
New York	14	673	90, 556	102. 037
Ohio	18	2, 358	376, 535	448, 232
Oklahoma	8	83	115, 803	245, 804
Pennsylvania	59	1, 846	456, 201	511, 752
Texas	9	88	60, 421	70, 615
Utah	1	0	503	(1)
West Virginia	39	1, 028	325, 543	354, 051
Wyoming	2	8	21, 829	62, 972
Total	229	9, 617	2, 344, 417	3, 120, 645

[1] Not available.

Source: American Gas Association.

TABLE 7.—Gas wells and condensate wells in the United States

State	Drilled during 1960 [1]	Producing Dec. 31, 1960	Drilled during 1961 [1]	Producing Dec. 31, 1961
Alabama	---	4	---	---
Alaska	3	2	5	5
Arizona	1	1	1	---
Arkansas	38	370	43	485
California	115	652	157	774
Colorado	125	466	116	462
Illinois	8	45	13	74
Indiana	12	350	6	300
Kansas	201	6, 003	326	6, 633
Kentucky	264	4, 829	238	5, 119
Louisiana	617	6, 479	632	6, 990
Maryland	---	38	---	34
Michigan	26	154	68	155
Mississippi	39	400	42	472
Missouri	---	9	---	9
Montana	8	999	4	981
Nebraska	2	53	2	49
New Mexico	420	6, 047	440	6, 491
New York	28	1, 000	16	1, 109
North Dakota	1	28	---	28
Ohio	260	7. 063	194	7, 077
Oklahoma	506	5, 800	593	6. 218
Pennsylvania	269	16. 350	212	16, 500
Tennessee	2	30	8	23
Texas	1, 539	18, 612	1, 551	19. 831
Utah	23	35	38	135
Virginia	8	92	2	98
West Virginia	686	14, 500	857	16, 297
Wyoming	57	350	100	460
Total	5, 258	90, 761	5, 664	96, 809

[1] From Oil and Gas Journal.

TABLE 8.—Marketed production, interstate shipments, and total consumption of natural gas in the United States,[1] in 1961

(Million cubic feet)

Census regions and States	Marketed production		Interstate movements		Transmission loss and unaccounted for	Change in underground storage	Consumption
	Quantity	Average value at wellhead (cents per Mcf)	Quantity shipped	Quantity received			
New England:							
Connecticut	--------	--------	--------	31,707	1,346	--------	30,361
Massachusetts	--------	--------	--------	84,886	3,118	--------	81,768
New Hampshire	--------	--------	--------	3,162	144	--------	3,018
Rhode Island	--------	--------	--------	13,401	621	--------	12,780
Total:							
1961	--------	--------	--------	133,156	5,229	--------	127,927
1960	--------	--------	--------	124,212	3,182	--------	121,030
Middle Atlantic:							
New Jersey	--------	--------	--------	166,768	12,962	--------	153,806
New York	5,742	29.5	2,152	443,172	13,047	−1,702	435.417
Pennsylvania	100,427	29.4	73,897	544,213	15,131	25,896	529,716
Total:							
1961	106,169	29.4	76,049	1,154,153	41,140	24,194	1,118,939
1960	118,918	31.8	56,425	1,073,126	33,244	22,869	1,079,506
East North Central:							
Illinois	9,970	12.8	761	578,729	6,974	6,618	574,346
Indiana	382	20.1	3,121	245,611	1,093	1,847	239,932
Michigan	27,697	21.1	--------	408,972	8,160	20,777	407,732
Ohio	36,423	24.9	160	707,871	4,329	20,131	719,674
Wisconsin	--------	--------	--------	117,619	3,940	--------	113,679
Total:							
1961	74,472	21.8	4,042	2,058,802	24,496	49,373	2,055,363
1960	68,872	21.0	872	1,915,214	39,081	37,013	1.907,120
West North Central:							
Iowa	--------	--------	--------	224,961	3,917	16,381	204,663
Kansas	649,083	12.5	531,778	271,777	14,776	9,349	364,957
Minnesota	--------	--------	--------	190,640	−1,944	--------	192,584
Missouri	90	24.7	--------	282,098	3,338	4,363	274,487
Nebraska	15,743	16.7	--------	128,094	668	--------	143.169
North Dakota	20,100	12.6	3,743	3,676	408	--------	19,625
South Dakota	--------	--------	--------	25,963	143	--------	25,820
Total:							
1961	685,016	12.6	535,521	1,127,209	21,306	30,093	1,225,305
1960	669,226	11.8	509,343	1,072,512	22,658	28,263	1,181,474
South Atlantic:							
Delaware	--------	--------	--------	9,912	532	--------	9,380
District of Columbia	--------	--------	--------	19,179	661	--------	18,518
Florida	29	18.9	--------	145,220	1,593	--------	143,656
Georgia	--------	--------	--------	181,193	1,236	--------	179,957
Maryland	3,578	27.2	1,261	68,219	2,146	--------	68,390
North Carolina	--------	--------	--------	52,744	2,221	--------	50,523
South Carolina	--------	--------	--------	63.395	2,467	--------	60,928
Virginia	2,466	27.1	2,204	72,942	2,625	--------	70,579
West Virginia	210,556	27.4	194,779	205,677	1,880	27,353	192,221
Total:							
1961	216,629	27.4	198,244	818,481	15,361	27,353	794,152
1960	215,079	26.2	162,019	750,402	15,768	25,508	762,186
East South Central:							
Alabama	56	7.4	14	183,040	−1,827	--------	184,909
Kentucky	70,937	24.8	53,176	150,612	2,821	3,640	161,912
Mississippi	172,543	18.6	150,460	175,056	5,970	239	190,930
Tennessee	71	18.3	--------	162,448	1,852	--------	160,667
Total:							
1961	243,607	20.4	203,650	671,156	8,816	3,879	698,418
1960	247,927	20.5	207,029	661,936	16,186	−1,667	688,315

---

[1] No shipments were made into Maine, Vermont, and Hawaii.

TABLE 8.—Marketed production, interstate shipments, and total consumption of natural gas in the United States,[1] in 1961—Continued

(Million cubic feet)

Census regions and States	Market production		Interstate movements		Transmission loss and unaccounted for	Change in underground storage	Consumption
	Quantity	Average value at wellhead (cents per Mcf)	Quantity shipped	Quantity received			
West South Central:							
Arkansas	59,547	13.5	3,323	169,200	15,429	575	209,420
Louisiana	3,271,857	18.7	2,356,241	119,523	−1,748	----------	1,036,887
Oklahoma	892.697	12.1	518,145	26,987	17,918	5,525	378,096
Texas	5,963,605	12.3	2,969,731	77,900	32,356	8,504	3,030,914
Total:							
1961	10,187,706	14.3	5,847,440	393,610	63,955	14,604	4,655,317
1960	9,760,835	13.1	5,637,064	508,180	99,427	3,861	4,528,663
Mountain:							
Arizona	----------	----------	----------	153,792	118	----------	153,674
Colorado	108,142	11.6	49,174	158,062	3,921	498	212,611
Idaho	----------	----------	----------	23,502	−467	----------	23,969
Montana	33,901	7.4	4,599	32,200	−136	3,857	57,781
Nevada	----------	----------	----------	15,873	9	----------	15,864
New Mexico	789,662	10.9	634,734	139,960	7,491	−1,058	288,455
Utah	57,175	15.7	35,083	61,979	1,733	459	81,879
Wyoming	194,674	12.5	141,714	9,803	1,745	−433	61,451
Total:							
1961	1,183.554	11.4	865,304	595,171	14,414	3,323	895,684
1960	1,172,400	11.2	815,852	491,649	9,212	5,129	833,856
Pacific:							
Alaska	631	20.4	----------	----------	74	----------	557
California	556,241	28.3	----------	881,483	39,045	−7,203	1,405,882
Oregon	----------	----------	----------	34,831	1,004	----------	33,827
Washington	----------	----------	----------	70,311	−32	----------	70,343
Total:							
1961	556,872	28.3	----------	986,625	40,091	−7,203	1,510,609
1960	517,781	26.7	----------	935,687	35,473	10,718	1,407,277
Total United States:							
1961	13,254,025	15.1	7,730,250	7,938,363	234,808	145,616	13,081,714
1960	12,771,038	14.0	7,388,604	7,532,918	274,231	131,694	12,509,427
Total foreign, 1961:			*Imports*	*Exports*			
Canada	----------	----------	167,104	5,577	----------	----------	----------
Mexico	----------	----------	51,756	5,170	----------	----------	----------
Total Movements:							
1961	----------	----------	7,949,110	7,949,110	----------	----------	----------
1960	----------	----------	7,544,250	7,544,250	----------	----------	----------

TABLE 9.—Natural gas moving interstate, imports, and exports, 1961

(Million cubic feet)

Consuming regions and countries or States	Quantity received	Producing region							
		Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Foreign imports
New England:									
Connecticut	31,707	1,109	62	-------	-------	885	28,656	-------	995
Massachusetts	84,886	2,932	163	-------	-------	2,343	76,819	-------	2,629
New Hampshire	3,162	-------	-------	-------	-------	-------	3,162	-------	-------
Rhode Island	13,401	679	38	-------	-------	541	11,535	-------	608
Total	133,156	4,720	263	-------	-------	3,769	120,172	-------	4,232
Middle Atlantic:									
New Jersey	166,768	3,733	221	-------	88	3,021	156,432	-------	3,273
New York	443,172	55,536	253	-------	4,773	5,460	372,318	-------	4,832
Pennsylvania	544,213	2,683	1,111	1	43,122	23,311	456,841	-------	17,144
Total	1,154,153	61,952	1,585	1	47,983	31,792	985,591	-------	25,249
East North Central:									
Illinois	578,729	-------	217	43,503	-------	248	533,000	888	873
Indiana	245,611	-------	17	31,862	-------	867	211,958	-------	907
Michigan	408,972	-------	-------	42,410	-------	239	365,943	-------	380
Ohio	707,871	8,737	1,801	31,511	99,993	27,284	524,877	-------	13,668
Wisconsin	117,619	-------	-------	2,753	-------	-------	58,024	155	56,687
Total	2,058,802	8,737	2,035	152,039	99,993	28,638	1,693,802	1,043	72,515
West North Central:									
Iowa	224,961	-------	-------	72,607	-------	-------	146,700	5,654	-------
Kansas	271,777	-------	-------	249	-------	-------	265,694	5,834	-------
Minnesota	190,640	-------	-------	82,458	-------	-------	100,367	6,431	1,384
Missouri	282,098	-------	-------	86,096	-------	375	194,869	47	711
Nebraska	128,094	-------	-------	60,766	-------	-------	52,477	14,851	-------
North Dakota	3,676	-------	-------	328	-------	-------	-------	2,700	648
South Dakota	25,963	-------	-------	8,417	-------	-------	9,075	8,471	-------
Total	1,127,209	-------	-------	310,921	-------	375	769,182	43,988	2,743
South Atlantic:									
Delaware	9,912	6	-------	-------	-------	8	9,898	-------	-------
District of Columbia	19,179	41	5	1	6,216	1,126	11,784	-------	6
Florida	145,220	-------	-------	-------	-------	9,409	135,807	-------	4
Georgia	181,193	-------	-------	-------	-------	47,740	133,376	-------	77
Maryland	68,219	261	23	3	19,887	3,945	44,044	-------	56
North Carolina	52,744	-------	-------	-------	-------	32	52,712	-------	-------
South Carolina	63,395	-------	-------	-------	-------	10,106	53,269	-------	20
Virginia	72,942	-------	18	1	20,406	3,999	48,517	-------	1
West Virginia	205,677	332	113	11	2,394	15,479	187,295	-------	53
Total	818,481	640	159	16	48,903	91,844	676,702	-------	217
East South Central:									
Alabama	183,040	-------	-------	-------	-------	41,946	141,035	-------	59
Kentucky	150,612	-------	-------	-------	1,365	1,152	146,934	-------	1,161
Mississippi	175,056	-------	-------	-------	-------	1,648	172,628	-------	780
Tennessee	162,448	-------	-------	-------	-------	271	161,063	-------	1,114
Total	671,156	-------	-------	-------	1,365	45,017	621,660	-------	3,114
West South Central:									
Arkansas	169,200	-------	-------	-------	-------	79	168,476	-------	645
Louisiana	119,523	-------	-------	-------	-------	2,025	116,382	-------	1,116
Oklahoma	26,987	-------	-------	2,492	-------	-------	24,138	357	-------
Texas	77,900	-------	-------	42	-------	111	69,787	6,896	1,064
Total	393,610	-------	-------	2,534	-------	2,215	378,783	7,253	2,825

TABLE 9.—Natural gas moving interstate, imports, and exports, 1961—Con.

(Million cubic feet)

Consuming regions and countries or States	Quantity received	Producing region							
		Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Foreign imports
Mountain:									
Arizona	153,792	-------	-------	-------	-------	-------	53,142	100,650	-------
Colorado	158,062	-------	-------	63,686	-------	-------	48,780	45,596	-------
Idaho	23,502	-------	-------	-------	-------	-------	-------	23,502	-------
Montana	32,200	-------	-------	2,448	-------	-------	-------	14,067	15,685
Nevada	15,893	-------	-------	-------	-------	-------	5,573	10,300	-------
New Mexico	139,960	-------	-------	1	-------	-------	122,250	17,709	-------
Utah	61,979	-------	-------	-------	-------	-------	-------	61,979	-------
Wyoming	9,803	-------	-------	1,878	-------	-------	1,481	6,444	-------
Total	595,171	-------	-------	68,013	-------	-------	231,226	280,247	15,685
Pacific:									
California	881,483	-------	-------	76	-------	-------	363,128	511,091	7,188
Oregon	34,831	-------	-------	-------	-------	-------	-------	20,050	14,781
Washington	70,311	-------	-------	-------	-------	-------	-------	-------	70,311
Total	986,625	-------	-------	76	-------	-------	363,128	531,141	92,280
Total United States	7,938,363	76,049	4,042	533,600	198,244	203,650	5,840,246	863,672	218,860
Foreign:									
Canada	5,577	-------	-------	1,921	-------	-------	3,582	74	-------
Mexico	5,170	-------	-------	-------	-------	-------	3,612	1,558	-------
Total exports	10,747	-------	-------	1,921	-------	-------	7,194	1,632	-------
Total	7,949,110	76,049	4,042	535,521	198,244	203,650	5,847,440	865,304	218,860

TABLE 10.—Consumption of natural gas in the United States [1]

State	Quantity (million cubic feet)					Change from 1960 (percent)	Estimated value at points of consumption (thousand dollars)	
	1957	1958	1959	1960	1961		1960	1961
Alabama	165, 772	172, 406	178, 595	184, 118	184, 909	0. 4	96, 355	100, 263
Alaska	----------	----------	133	229	557	143. 2	30	189
Arizona	105. 536	105. 034	112, 722	135. 494	153, 674	13. 5	57, 521	73, 246
Arkansas	201, 306	202. 361	218. 528	216. 516	209, 420	−3. 3	88, 946	66. 807
California	1, 091, 236	1. 078. 855	1, 180. 331	1, 311, 253	1, 405. 882	7. 2	729, 391	803. 404
Colorado	176. 936	165. 099	196, 057	207. 646	212, 611	2. 4	78. 502	83. 120
Connecticut	20, 328	27, 884	25, 875	28. 453	30, 361	6. 7	43, 040	51, 080
Delaware	6, 014	8, 301	9, 459	9, 035	9, 380	3. 8	9, 790	10, 549
District of Columbia	15, 701	17, 594	17, 123	18, 142	18, 518	2. 1	26, 902	28, 050
Florida	38, 871	44. 174	91. 490	137, 875	143. 656	4. 2	69. 736	75. 151
Georgia	154, 778	164, 114	180. 342	182, 087	179, 957	−1. 2	111, 724	109, 034
Idaho	10, 733	15, 903	19, 641	22. 006	23, 969	8. 9	11, 787	13, 364
Illinois	422, 840	452, 006	518. 111	536. 549	574, 346	7. 0	401, 613	419, 578
Indiana	145, 179	154. 583	171, 158	212, 851	239, 932	12. 7	133, 217	151. 592
Iowa	154, 964	159. 982	182. 827	187, 138	204. 663	9. 4	105. 196	112, 993
Kansas	343. 833	362, 280	380, 241	372, 302	364, 957	−2. 0	114, 440	115. 179
Kentucky	132, 436	136, 990	147, 993	159. 710	161, 912	1. 4	88, 752	90, 948
Louisiana	840, 331	931, 203	893. 369	947, 938	1, 036. 887	9. 4	215, 251	237, 206
Maryland	51, 177	57, 328	60, 674	64, 923	68. 390	5. 3	88, 563	92, 817
Massachusetts	56, 626	67, 602	72, 994	77. 886	81, 768	5. 0	132, 418	141. 664
Michigan	272, 353	298, 104	332, 756	368, 531	407, 732	10. 6	294, 713	335. 571
Minnesota	147, 732	149, 042	161. 390	179, 827	192. 584	7. 1	118, 243	128. 850
Mississippi	148, 279	157, 169	183. 158	188, 864	190. 930	1. 1	68, 284	68. 319
Missouri	223. 528	241. 239	255. 095	261, 372	274, 487	5. 0	147, 351	152, 866
Montana	52, 200	51. 825	52, 183	54, 569	57, 781	5. 9	22, 717	23, 278
Nebraska	116. 326	114, 661	132, 651	139, 028	143, 169	3. 0	66, 130	68, 407
Nevada	8, 666	8, 826	10. 450	12, 447	15, 864	27. 5	9, 004	11, 108
New Hampshire	1, 787	2, 421	2. 480	2, 852	3, 018	5. 8	4, 658	4, 821
New Jersey	100, 483	119, 946	132, 984	139, 258	153, 806	10. 4	205, 564	228. 946
New Mexico	243, 800	251, 518	272, 922	266, 409	288, 455	8. 3	53, 441	57, 490
New York	299, 153	343, 326	379, 928	419, 460	435, 417	3. 8	532. 568	580, 936
North Carolina	19, 533	23, 519	32, 685	45, 442	50, 523	11. 2	33. 514	37, 329
North Dakota	13, 753	15, 639	16, 981	17, 274	19, 625	13. 6	6, 844	7. 255
Ohio	583, 753	618, 022	670, 618	698, 569	719, 674	3. 0	491, 643	506, 304
Oklahoma	387, 277	342, 080	379, 178	383, 042	378, 096	−1. 3	100, 109	102, 899
Oregon	18, 227	22, 752	27, 498	30. 861	33, 827	9. 6	23. 042	25, 097
Pennsylvania	445, 813	465. 732	502. 066	520, 788	529, 716	1. 7	418, 015	436, 203
Rhode Island	8, 139	9, 940	11, 011	11, 839	12, 780	7. 9	19, 156	20, 824
South Carolina	39, 741	39. 678	54, 363	58, 532	60. 928	4. 1	34, 087	36, 629
South Dakota	18, 251	19, 535	23, 584	24, 533	25, 820	5. 2	14, 778	15, 129
Tennessee	130. 601	142. 860	149, 462	155. 623	160, 667	3. 2	81, 254	71, 730
Texas	2, 455, 528	2, 555, 541	2, 865. 595	2, 981. 167	3, 030, 914	1. 7	577, 582	594. 251
Utah	57. 004	55. 706	61, 401	75. 650	81, 879	8. 2	33, 825	36, 698
Virginia	48, 527	56, 052	59, 842	66, 181	70, 579	6. 6	68, 420	73, 276
Washington	40. 108	53. 063	58. 650	64. 934	70, 343	8. 3	40, 360	40, 472
West Virginia	159, 520	164. 347	191. 548	179, 969	192, 221	6. 8	97, 092	102. 622
Wisconsin	59. 592	67. 596	82, 377	90. 620	113, 679	1. 6	89, 572	108. 292
Wyoming	45, 504	46. 810	59, 119	59, 635	61, 451	3. 0	14, 600	15, 570
Total	10, 279, 775	10. 760, 648	11, 819, 638	12, 509, 427	13, 081. 714	4. 6	6, 269, 740	6, 667, 406

---

[1] Includes volume of natural gas which is distributed as a component of mixed gas.

TABLE 11.—Residential and commercial consumption of natural gas in the United States[1]

State	Residential				Commercial				Total			
	Number of consumers (thousand)	Quantity (million cubic feet)	Value at point of consumption		Number of consumers (thousand)	Quantity (million cubic feet)	Value at point of consumption		Number of consumers (thousand)	Quantity (million cubic feet)	Value at point of consumption	
			Total (thousand dollars)	Average (cents per Mcf)			Total (thousand dollars)	Average (cents per Mcf)			Total (thousand dollars)	Average (cents per Mcf)
Alabama	765	38,591	46,615	120.8	42	26,617	15,745	59.2	807	65,208	62,360	95.6
Alaska	(2)	188	50	26.6	-----	118	98	83.1	-----	306	148	48.4
Arizona	294	24,976	27,865	111.6	37	13,994	9,053	64.7	331	38,970	36,918	94.7
Arkansas	278	33,772	23,580	69.8	42	17,833	9,054	50.8	320	51,605	32,634	63.2
California	4,362	375,603	376,835	100.3	330	112,774	77,928	69.1	4,692	488,377	454,763	93.1
Colorado	361	55,740	37,167	66.7	49	30,895	17,314	56.0	410	86,635	54,481	62.9
Connecticut	352	17,771	35,475	199.6	24	4,082	7,053	172.8	376	21,853	42,528	194.6
Delaware	62	4,272	7,439	174.1	3	710	1,079	152.0	65	4,982	8,518	171.0
District of Columbia and Maryland	693	57,062	88,929	155.8	56	12,754	17,883	140.2	749	69,816	106,812	153.0
Florida	238	8,400	23,349	278.0	20	6,800	6,969	102.5	258	15,200	30,318	199.5
Georgia	552	57,011	59,620	104.6	46	21,909	15,230	69.5	598	78,920	74,850	94.8
Idaho	27	2,656	3,470	130.6	6	3,216	2,892	89.9	33	5,872	6,362	108.3
Illinois	2,203	251,735	289,521	115.0	137	57,910	48,459	83.7	2,340	309,645	337,980	109.2
Indiana	752	84,553	83,156	98.3	65	23,942	16,280	68.0	817	108,495	99,436	91.7
Iowa	567	61,528	57,911	94.1	73	30,118	20,321	67.5	640	91,646	78,232	85.4
Kansas	532	84,339	51,730	61.3	50	21,767	9,047	41.6	582	106,106	60,777	57.3
Kentucky	407	58,941	48,330	82.0	41	22,959	15,311	66.7	448	81,900	63,641	77.7
Louisiana	683	57,146	37,816	66.2	58	26,388	10,205	38.7	741	83,534	48,021	57.5
Massachusetts	946	49,627	105,719	213.0	59	11,804	20,541	174.0	1,005	61,431	126,260	205.5
Michigan	1,463	218,084	216,746	99.4	125	42,838	38,475	89.8	1,588	260,922	255,221	97.8
Minnesota	516	66,771	76,849	115.1	40	24,422	20,758	85.0	556	91,193	97,607	107.0
Mississippi	256	22,856	20,032	87.6	35	17,164	8,353	48.7	291	40,020	28,385	70.9
Missouri	786	115,012	93,036	80.9	60	33,665	21,703	64.5	846	148,677	114,739	77.2
Montana	110	17,180	11,247	65.5	13	12,207	5,598	45.9	123	29,387	16,845	57.3
Nebraska	297	40,235	33,929	84.3	40	22,415	13,016	58.1	337	62,650	46,945	74.9
Nevada	17	1,540	2,096	136.1	1	346	346	100.0	18	1,886	2,442	129.5
New Hampshire	31	1,909	3,444	180.4	2	515	866	168.2	33	2,424	4,310	177.8
New Jersey	1,436	88,251	179,573	203.5	101	12,250	21,189	173.0	1,537	100,501	200,762	199.8
New Mexico	162	22,520	17,899	79.5	20	10,269	5,089	49.6	182	32,789	22,988	70.1
New York	3,710	239.606	394,214	164.5	277	70,852	106,205	149.9	3,987	310,458	500,419	161.2
North Carolina	133	9,511	14,314	150.5	18	4,173	5,568	133.4	151	13,684	19,882	145.3
North Dakota	34	4,168	3,590	86.1	4	3,143	1,856	59.1	38	7,311	5,446	74.5
Ohio	2,110	374,026	298,964	79.9	169	115,907	84,438	72.8	2,279	489,933	383,402	78.3
Oklahoma	577	62,918	44,850	71.3	62	23,605	11,929	50.5	639	86,523	56,779	65.6
Oregon	95	7,088	10,923	154.1	12	3,259	4,803	147.4	107	10,347	15,726	152.0
Pennsylvania	2,063	237,276	261,572	110.2	124	58,804	51,157	87.0	2,187	296,080	312,729	105.6

Rhode Island	148	7, 297	14, 994	205. 5	7	1, 993	2, 915	146. 3	155	9, 290	17, 909	192. 8
South Carolina	121	7, 744	11, 902	153. 7	15	4, 922	5, 283	107. 3	136	12, 666	17, 185	135. 7
South Dakota	60	7, 900	7, 660	97. 0	8	7, 623	4. 306	56. 5	68	15, 523	11, 966	77. 1
Tennessee	367	33, 925	32, 140	94. 7	40	33. 050	18, 519	56. 0	407	66, 975	50, 659	75. 6
Texas	1, 947	166, 188	130, 975	78. 8	194	62, 334	32, 907	52. 8	2, 141	228. 522	163. 882	71. 7
Utah	163	24, 706	18. 440	74. 6	19	10. 160	5, 317	52. 3	182	34, 866	23. 757	68. 1
Virginia	354	28, 500	45, 953	161. 2	21	12, 555	13, 585	108. 2	375	41, 055	59, 538	145. 0
Washington	97	8, 500	12, 239	144. 0	21	6, 974	6, 868	98. 5	118	15, 474	19, 107	123. 5
West Virginia	321	49, 174	41, 181	83. 7	30	15, 650	10, 848	69. 3	351	64, 824	52, 029	80. 3
Wisconsin	544	52, 118	65, 958	126. 6	36	12. 745	12, 876	101. 0	580	64, 863	78, 834	121. 5
Wyoming	60	9, 664	5, 940	61. 5	9	6, 419	2. 825	44. 0	69	16, 083	8, 765	54. 5
Total:												
1961	32. 052	3, 248, 578	3, 475, 237	107. 0	2, 641	1, 076, 849	838, 060	77. 8	34, 693	4, 325, 427	4, 313, 297	99. 7
1960	31, 148	3, 103, 167	3, 209, 227	103. 4	2, 584	1, 020, 222	790, 984	77. 5	33, 732	4, 123, 389	4, 000, 211	97. 0

[1] Includes natural gas mixed with manufactured gas.

[2] Less than 500 consumers.

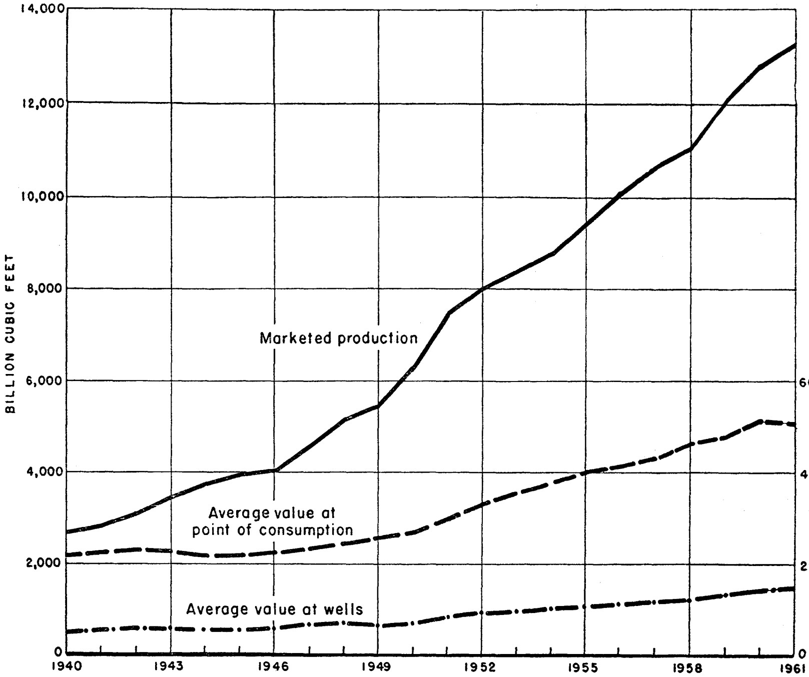

FIGURE 1.—Production and average value of natural gas in the United States, 1940–61.

INTERSTATE SHIPMENTS, IMPORTS AND EXPORTS

Interstate shipments, including imports and exports, increased 5 percent from 7,544,250 million cubic feet in 1960 to 7,949,110 million. The West South Central region furnished 74 percent of these shipments followed by Mountain, West North Central and Foreign—supplying 11 percent, 7 percent, and 3 percent, respectively. Interstate movements, excluding imports, amounted to 7,730,250 million cubic feet—58 percent of marketed production.

Imports totaling 218,860 million cubic feet increased 41 percent. Canadian natural gas received in Idaho, Minnesota, Montana, and Washington totaled 167,104 million cubic feet, and the balance of 51,756 million cubic feet was received in Texas from Mexico. Exports remained at the same level as in 1960. Canada received 5,577 million cubic feet, and Mexico received 5,170 million cubic feet.

PIPELINES

Construction of a natural gas pipeline by the Pacific Gas Transmission Company was completed. This line extends from Canada through a gateway in Idaho to the Oregon-California State line. The Pacific Gas and Electric Company constructed a line tying this into their system.

Total cost of natural gas construction authorized by the Federal Power Commission was $309,015,000, smallest authorization in the last ten years. In addition to 2,068 miles of line, which will require an estimated 443,124 net tons of steel line pipe, authorized construction included installing compressors aggregating 195,015 horsepower. These projects, when completed, will add approximately 1 billion cubic feet daily of capacity to existing facilities.

CONSUMPTION

Natural gas was consumed in 47 States; none was consumed in Maine, Vermont, or Hawaii. Total consumption was 13,082 billion cubic feet, an increase of 5 percent. Consumption by class of consumer and percentage change from 1960 were as follows: residential, 3,249 billion cubic feet (+5 percent); commercial, 1,077 billion cubic feet (+6 percent); industrial fuel, 6,714 billion cubic feet (+5 percent); field use, 1,881 billion cubic feet (+6 percent); and carbon black, 161 billion cubic feet (−19 percent). The portland cement industry consumed 180 billion cubic feet, compared with 171 billion in 1960.

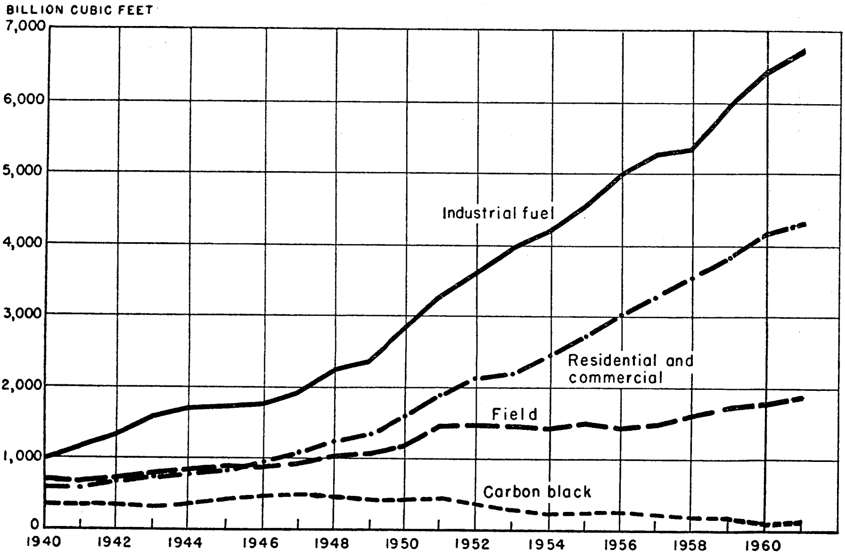

FIGURE 2.—Consumption of natural gas, by uses, in the United States, 1940–61.

TABLE 12.—Industrial consumption of natural gas in the United States

State	Field (pumping, drilling, extraction loss, and other)			Carbon black			Fuel						Total industrial			Fuel used at electric utility plants [1]
	Quantity (million cubic feet)	Value (thousand dollars)	Average value (cents per Mcf)	Quantity (million cubic feet)	Value at point of consumption		Refinery fuel (million cubic feet)	Natural gas pipeline (million cubic feet)	Other industrial fuel (million cubic feet)	Total fuel (million cubic feet)	Value (thousand dollars)	Average value (cents per Mcf)	Quantity (million cubic feet)	Value at point of consumption		
					Total (thousand dollars)	Average (cents per Mcf)								Total (thousand dollars)	Average (cents per Mcf)	
Alabama	33	3	9.1	--------	--------	--------	(2)	7,586	[2] 112,082	119,668	37,900	31.7	119,701	37,903	31.7	8,197
Alaska	204	33	16.2	--------	--------	--------	--------	47	--------	47	8	17.0	251	41	16.3	--------
Arizona	--------	--------	--------	--------	--------	--------	--------	15,540	99,164	114,704	36,328	31.7	114,704	36,328	31.7	60,581
Arkansas	12,989	2,001	15.4	--------	--------	--------	10,217	9,189	125,420	144,826	32,172	22.2	157,815	34,173	21.7	42,568
California	[3] 168,837	[3] 45,721	27.1	(3)	(3)	--------	76,752	11,710	660,206	748,668	302,920	40.5	917,505	348,641	38.0	396,550
Colorado	11,886	1,761	14.8	--------	--------	--------	3,055	2,061	108,974	114,090	26,878	23.6	125,976	28,639	22.7	36,648
Connecticut	--------	--------	--------	--------	--------	--------	--------	317	8,191	8,508	8,552	100.5	8,508	8,552	100.5	634
Delaware	--------	--------	--------	--------	--------	--------	(2)	--------	[2] 4,398	4,398	2,031	46.2	4,398	2,031	46.2	3,118
District of Columbia and Maryland	15	7	46.7	--------	--------	--------	--------	1,015	16,062	17,077	14,048	82.3	17,092	14,055	82.2	62
Florida	29	7	24.1	--------	--------	--------	--------	1,166	127,261	128,427	44,826	34.9	128,456	44,833	34.9	84,527
Georgia	--------	--------	--------	--------	--------	--------	(2)	3,581	[2] 97,456	101,037	34,184	33.8	101,037	34,184	33.8	16,561
Idaho	--------	--------	--------	--------	--------	--------	--------	524	17,573	18,097	7,002	38.7	18,097	7,002	38.7	--------
Illinois	17,782	2,156	12.1	--------	--------	--------	9,503	10,022	227,394	246,919	79,442	32.2	264,701	81,598	30.8	33,651
Indiana	55	13	23.6	--------	--------	--------	5,940	5,356	120,086	131,382	52,143	39.7	131,437	52,156	39.7	9,279
Iowa	--------	--------	--------	--------	--------	--------	--------	8,288	104,729	113,017	34,761	30.8	113,017	34,761	30.8	57,069
Kansas	[3] 24,367	[3] 3,509	14.4	(3)	(3)	--------	24,297	42,476	167,711	234,484	50,893	21.7	258,851	54,402	21.0	89,928
Kentucky	12,932	2,572	19.9	--------	--------	--------	(2)	20,073	[2] 47,007	67,080	24,735	36.9	80,012	27,307	34.1	1,942
Louisiana	229,662	30,068	13.1	21,160	2,359	11.1	113,725	33,536	555,270	702,531	156,758	22.3	953,353	189,185	19.8	125,844
Massachusetts	--------	--------	--------	--------	--------	--------	--------	335	20,002	20,337	15,404	75.7	20,337	15,404	75.7	8,568
Michigan	2,597	491	18.9	--------	--------	--------	2,031	1,717	140,465	144,213	79,859	55.4	146,810	80,350	54.7	8,178
Minnesota	--------	--------	--------	--------	--------	--------	(2)	631	[2] 100,760	101,391	31,243	30.8	101,391	31,243	30.8	47,867
Mississippi	16,475	3,141	19.1	--------	--------	--------	(2)	31,019	[2] 103,416	134,435	36,793	27.4	150,910	39,934	26.5	33,874
Missouri	--------	--------	--------	--------	--------	--------	(2)	7,595	[2] 118,215	125,810	38,127	30.3	125,810	38,127	30.3	34,012
Montana	5,203	467	9.0	--------	--------	--------	3,261	1,313	18,617	23,191	5,966	25.7	28,394	6,433	22.7	356
Nebraska	5,941	644	10.8	--------	--------	--------	(2)	6,557	[2] 68,021	74,578	20,818	27.9	80,519	21,462	26.7	33,094
Nevada	--------	--------	--------	--------	--------	--------	--------	--------	13,978	13,978	8,666	62.0	13,978	8,666	62.0	8,986
New Hampshire	--------	--------	--------	--------	--------	--------	--------	--------	594	594	511	86.0	594	511	86.0	--------
New Jersey	--------	--------	--------	--------	--------	--------	--------	471	52,834	53,305	28,184	52.9	53,305	28,184	52.9	22,912
New Mexico	129,763	14,450	11.1	43,102	3,510	8.1	1,797	25,751	55,253	82,801	16,542	20.0	255,666	34,502	13.5	35,574
New York	606	360	59.4	--------	--------	--------	--------	2,402	121,951	124,353	80,157	64.5	124,959	80,517	64.5	60,913
North Carolina	--------	--------	--------	--------	--------	--------	--------	--------	36,839	36,839	17,447	47.4	36,839	17,447	47.4	2,061

North Dakota	10,663	1,159	10.9	---------	---------	---------	(2)	6	[2] 1,645	1,651	650	39.4	12,314	1,809	14.7	33
Ohio	1,463	609	41.6	---------	---------	---------	7,528	9,131	211,619	228,278	122,293	53.6	229,741	122,902	53.5	2,161
Oklahoma	146,347	15,179	10.4	---------	---------	---------	49,048	10,054	86,124	145,226	30,941	21.3	291,573	46,120	15.8	83,129
Oregon	---------	---------	---------	---------	---------	---------	---------	64	23,416	23,480	9,371	39.9	23,480	9,371	39.9	572
Pennsylvania	3,150	962	30.5	---------	---------	---------	23,859	12,664	193,963	230,486	122,512	53.2	233,636	123,474	52.8	2,612
Rhode Island	---------	---------	---------	---------	---------	---------	---------	309	3,181	3,490	2,915	83.5	3,490	2,915	83.5	392
South Carolina	---------	---------	---------	---------	---------	---------	---------	1,448	46,814	48,262	19,444	40.3	48,262	19,444	40.3	21,824
South Dakota	---------	---------	---------	---------	---------	---------	---------	52	10,245	10,297	3,163	30.7	10,297	3,163	30.7	4,897
Tennessee	---------	---------	---------	---------	---------	---------	(2)	15,412	[2] 78,280	93,692	21,071	22.5	93,692	21,071	22.5	6,777
Texas	1,023,303	108,190	10.6	92,583	9,774	10.6	412,461	62,800	1,211,245	1,686,506	312,405	18.5	2,802,392	430,369	15.4	420,803
Utah	7,592	1,230	16.2	---------	---------	---------	4,221	155	35,045	39,421	11,711	29.7	47,013	12,941	27.5	4,886
Virginia	15	6	40.0	---------	---------	---------	---------	4,700	24,809	29,509	13,732	46.5	29,524	13,738	46.5	1,597
Washington	---------	---------	---------	---------	---------	---------	---------	422	54,447	54,869	21,365	38.9	54,869	21,365	38.9	---------
West Virginia	31,941	8,596	26.9	---------	---------	---------	638	7,514	87,304	95,456	41,997	44.0	127,397	50,593	39.7	738
Wisconsin	---------	---------	---------	---------	---------	---------	(2)	398	[2] 48,418	48,816	29,458	60.3	48,816	29,458	60.3	10,723
Wyoming	21,890	2,339	10.7	---------	---------	---------	10,686	2,200	10,592	23,478	4,466	19.0	45,368	6,805	15.0	643
Total:																
1961	[3]1,881,208	[3]244,589	13.0	[3]161,377	[3]16,728	10.4	[2]772,028	377,607	[2]5,564,067	6,713,702	2,092,792	31.2	8,756,287	2,354,109	26.9	1,825,341
1960	1,779,671	220,002	12.4	197,628	19,853	10.0	775,154	347,075	5,286,510	6,408,739	2,029,674	31.7	8,386,038	2,269,529	27.1	1,724,763

---

[1] Federal Power Commission. Preliminary. Includes gas other than natural, impossible to segregate and therefore shown separately. Natural gas portion is included in "Other industrial fuel."

[2] 13,009 million cubic feet included in "Other industrial fuel" to avoid disclosure; included in "Refinery fuel" United States total.

[3] 4,532 million cubic feet and 1,085 thousand dollars in value included in "Field" to avoid disclosure; included in "Carbon black" United States total.

TABLE 13.—Natural gas processed at natural gas processing plants in the United States

(Million cubic feet)

States	1957	1958	1959	1960	1961
Arkansas	43,696	42,538	73,503	120,943	112,490
California	564,675	612,389	527,297	548,406	553,734
Colorado	[1] 57,759	[1] 61,251	[1] 101,253	84,322	96,177
Illinois	[2] 192,821	[2] 200,397	[2] 197,246	[3] 194,679	198,964
Kansas	426,454	390,814	432,068	451,676	508,213
Kentucky	[3] 396,695	[3] 288,907	[3] 375,591	[3,4] 273,558	[3,4] 295,314
Louisiana	865,836	973,299	1,047,481	1,491,078	1,694,071
Michigan	(2)	(2)	(2)	(4)	(4)
Mississippi	157,249	171,008	180,583	131,369	108,156
Montana	(1)	(1)	(1)	[6] 41,480	[6] 55,850
Nebraska [5]	25,159	35,205	37,680	41,663	40,388
New Mexico	617,726	563,227	652,976	662,479	665,602
Ohio	(2)	(2)	--------	--------	--------
Oklahoma	618,715	651,077	708,616	760,743	798,653
Pennsylvania	10,974	5,358	2,932	2,639	2,612
Texas	4,354,756	4,233,619	4,508,288	4,578,623	4,771,916
Utah	(1)	(1)	(1)	(6)	(6)
West Virginia	181,390	156,653	215,979	214,372	209,753
Wyoming	64,656	66,802	125,369	170,159	149,776
Total	8,578,561	8,452,544	9,186,862	9,768,189	10,261,669

[1] Montana and Utah included in Colorado.
[2] Michigan and Ohio included in Illinois.
[3] Includes gas from transmission lines; previously treated in other States.
[4] Michigan included in Kentucky.
[5] North Dakota included in Nebraska.
[6] Utah included in Montana.

TABLE 14.—Consumption of natural gas used with manufactured gas in the United States[1]

State	Residential		Commercial		Industrial	Total	
	Number of consumers (thousand)	Quantity (million cubic feet	Number of consumers (thousand)	Quantity (million cubic feet)	Quantity (million cubic feet)	Quantity (million cubic feet)	Value at point of consumption (thousand dollars)
Connecticut	46	1,616	3	425	261	2,302	4,462
Indiana	159	10,522	8	2,335	4,229	17,086	15,221
Massachusetts	287	11,770	20	2,800	3,940	18,510	38,790
New Jersey	424	19,006	36	2,179	8,313	29,498	46,605
New York	415	58,294	19	10,594	16,158	85,046	136,077
Pennsylvania	758	53,734	34	5,488	26,073	85,295	93,741
Total:							
1961	2,089	154,942	120	23,821	58,974	237,737	334,896
1960	2,529	151,775	148	26,994	70,075	248,844	342,430

[1] Included in tables for consumption of natural gas (tables 10–12).

VALUE AND PRICE

Average wellhead value of natural gas was 15.1 cents per thousand cubic feet, an increase of 1.1 cents per thousand from 1960. Estimated total value was $1,996,241,000, compared to $1,789,970,000 in 1960.

Average value at point of consumption was 51.0 cents per thousand cubic feet, an increase of 0.9 cent per thousand from 1960. Total value was $6,667,406,000, compared with $6,269,740,000 in 1960.

TABLE 15.—Average value of natural gas in the United States

(Cents per thousand cubic feet)

State	At wells (estimated)		At point of consumption		State	At wells (estimated)		At point of consumption	
	1960	1961	1960	1961		1960	1961	1960	1961
Alabama	7.3	7.4	52.3	54.2	Nebraska	17.5	16.7	47.6	47.8
Alaska	12.2	20.4	13.1	33.9	Nevada	-------	-------	72.3	70.0
Arizona	-------	-------	42.5	47.7	New Hampshire	-------	-------	163.3	159.7
Arkansas	11.9	13.5	41.1	31.9	New Jersey	-------	-------	147.6	48.9
California	26.7	28.3	55.6	57.1	New Mexico	10.7	10.9	20.1	19.9
Colorado	11.9	11.6	37.8	39.1	New York	30.9	29.5	127.0	133.4
Connecticut	-------	-------	151.3	168.2	North Carolina	-------	-------	73.8	73.9
Delaware	-------	-------	108.4	112.5	North Dakota	11.4	12.6	39.6	37.0
District of Columbia	-------	-------	148.3	151.5	Ohio	23.5	24.9	70.4	70.4
Florida	16.2	18.9	50.6	52.3	Oklahoma	11.9	12.1	26.1	27.2
Georgia	-------	-------	61.4	61.4	Oregon	-------	-------	74.7	74.2
Idaho	-------	-------	53.6	55.8	Pennsylvania	31.8	29.4	80.3	82.3
Illinois	12.5	12.8	74.9	73.1	Rhode Island	-------	-------	161.8	162.9
Indiana	17.8	20.1	62.6	63.2	South Carolina	-------	-------	58.2	60.1
Iowa	-------	-------	56.2	55.2	South Dakota	-------	-------	60.2	58.6
Kansas	11.7	12.5	30.7	31.6	Tennessee	17.5	18.3	52.2	44.6
Kentucky	24.4	24.8	55.6	56.2	Texas	11.3	12.3	19.4	19.6
Louisiana	17.1	18.7	22.7	22.9	Utah	18.0	15.7	44.7	44.8
Maryland	26.6	27.2	136.4	135.7	Virginia	27.1	27.1	103.4	103.8
Massachusetts	-------	-------	170.0	173.3	Washington	-------	-------	62.2	57.5
Michigan	21.4	21.1	80.0	82.3	West Virginia	26.2	27.4	53.9	54.4
Minnesota	-------	-------	65.8	66.9	Wisconsin	-------	-------	98.8	95.3
Mississippi	18.8	18.6	36.2	35.8	Wyoming	12.0	12.5	24.5	25.3
Missouri	25.0	24.7	56.4	55.7					
Montana	7.1	7.4	41.6	40.3	Total	14.0	15.1	50.1	51.0

WORLD PRODUCTION

Statistics on natural gas production in all known countries have been compiled in million cubic feet by the Bureau of Mines. These data are comparable as far as possible to the Bureau of Mines marketed production series.

TABLE 16.—Marketed production of natural gas by countries [1] at 60° F (15.56° C) and normal atmospheric pressure

(Million cubic feet)

Country [1]	1957	1958	1959	1960	1961
North America:					
Barbados	108	98	86	88	109
Canada	220,007	337,804	417,335	522,972	657,892
Mexico [2]	173,262	277,576	348,112	360,691	360,547
Trinidad	21,211	23,403	25,206	27,042	29,367
United States	10,680,258	11,030,298	12,046,115	12,771,038	13,254,025
South America:					
Argentina	31,785	32,328	32,119	51,607	86,881
Bolivia	299	224	261	224	(3)
Brazil [2]	5,866	11,213	15,994	19,962	19,663
Chile [2]	29,723	49,858	67,746	81,873	95,120
Colombia [2]	23,624	29,632	33,887	30,341	(3)
Peru [2]	37,510	33,762	(3)	(3)	(3)
Venezuela	135,241	146,691	156,434	171,898	182,532
Europe:					
Austria	28,308	30,613	42,098	54,830	58,073
Czechoslovakia	28,805	46,501	(3)	(3)	(3)
France	16,299	21,367	50,804	106,199	149,808
Germany, West	13,328	12,832	14,466	16,717	17,960
Hungary [2]	15,339	13,995	12,353	12,694	12,080
Italy	186,118	193,156	228,307	240,610	256,019
Netherlands	6,195	7,763	9,330	12,316	15,339
Poland	15,592	14,267	15,589	20,205	27,393
Rumania	172,895	189,410	215,797	243,276	242,580
U.S.S.R	693,524	1,115,495	1,388,304	1,754,040	2,272,788
Yugoslavia	1,550	1,719	1,866	1,976	2,566
Asia:					
Brunei	2,823	2,757	2,847	3,043	[4] 2,525
Burma	225	325	178	261	333
India	4,764	4,725	4,794	5,201	(3)
Indonesia [2]	80,910	77,887	83,224	90,725	91,315
Iran	25,578	26,288	32,055	36,299	104,304
Israel	----------	----------	----------	1,203	9,890
Japan [2]	9,092	13,730	18,913	27,297	35,464
Pakistan	15,349	19,308	22,365	29,842	34,665
Taiwan	1,073	979	983	949	1,383
Africa:					
Algeria (Sahara) [2]	----------	4,083	13,786	(3)	9,330
Gabon, Republic of	----------	15	258	278	248
Morocco	126	69	154	352	(3)
Tunisia	225	218	225	252	271
Oceania: New Zealand	7	5	6	5	6

[1] Natural gas is produced in China, but there is no recent information available.
[2] Total production.
[3] Data not available.
[4] Estimate.

NOTE: Data relate, as far as possible, to natural gas actually collected and utilized as fuel or raw material. They exclude gas used for repressuring, as well as gas flared, vented, or otherwise wasted, whether or not it has first been processed for the extraction of natural gasoline.

For countries reporting in the metric system, the following conversion factor will be used:

$$\text{m}^3 \text{ at } 32° \text{ F } (0° \text{ C}) \times 37.32 = \text{ft}^3 \text{ at } 60° \text{ F}$$
$$(\text{ft}^3 \text{ at } 60° \text{ F} \times 0.026795 = \text{m}^3 \text{ at } 32° \text{ F})$$

Compiled by Liela S. Price, Division of Foreign Activities.

Natural Gas Liquids

By I. F. Avery,[1] W. G. Messner,[2] B. D. Furgang,[3] and E. R. Eliff[4]

Contents

Page
General summary 333
Scope of report 333
Reserves 335
Production 336
Natural gas processed, yield, and number of plants 339
Demand for natural gas liquids at plants and terminals 339
Shipments of liquefied petroleum gases and ethane 344
Stocks 352
Storage capacity 354
Prices 354
Foreign trade 355

GENERAL SUMMARY

NATURAL gas liquids production in 1961 totaled 15,191 million gallons, a gain of 6.3 percent over the preceding year. Liquefied petroleum (LP) gases and ethane, which represent 60 percent of the total natural gas liquids production, increased 7.6 percent in 1961. Natural gasoline and isopentane production increased 4.1 percent, and the output of other finished products was 12.4 percent above the 1961 level. The output of finished gasoline and naphtha declined 6 percent.

Shipments of natural gas liquids to refineries and terminals for use as blending material in motor fuel totaled 7,973 million gallons in 1961 compared with 7,522 million in 1960. Natural gas liquids accounted for 12.3 percent of the total motor fuel produced in 1961. Shipments of liquefied gases and ethane, which include LP-gases produced at plants and liquefied refinery (LR) gases produced at petroleum refineries for uses other than blending into gasoline, totaled 9,798 million gallons in 1961, exceeding the shipments for the preceding year by 2.7 percent.

SCOPE OF REPORT

Statistics on natural gas liquids are collected by the Bureau of Mines from reports submitted by natural gasoline plants, cycling plants, and fractionators that handle natural gas liquids. Information on production, stocks, and distribution is obtained from monthly reports. Annual reports provide data on type of plant, production, value of production, and volume of gas processed. Reports submitted to the Bureau cover all except the small volume of natural

---

[1] Commodity-industry analyst.
[2] Business analyst.
[3] Statistical clerk.
[4] Statistical assistant.

TABLE 1.—Salient statistics of the natural gas liquids industry in the United States, 1957–1961

(Thousand gallons unless otherwise stated)

	1957	1958	1959	1960	1961
Production:					
Natural gasoline and isopentane	4,499,495	4,355,025	4,222,266	4,479,454	4,666,319
LP-gases and ethane	6,655,282	6,783,000	7,874,706	8,444,074	9,085,465
Finished gasoline and naphtha	779,807	701,456	660,666	503,659	473,496
Other finished products	455,005	539,977	714,170	859,394	965,648
Total	12,389,589	12,379,458	13,471,808	14,286,581	15,190,928
Shipments for use in gasoline [1]	7,241,831	6,904,179	7,067,963	7,522,372	7,973,162
Transfers to nongasoline uses:					
LP-gases and ethane [2]	4,915,211	5,174,140	6,149,430	6,391,217	6,693,573
Other finished products	181,011	191,077	158,708	212,483	197,823
Stocks at plants, terminals, and refineries:					
Natural gasoline	168,244	198,284	170,058	197,559	198,608
LP-gases	568,601	664,705	790,579	946,758	1,294,090
Other finished products	109,727	92,595	84,606	70,507	64,120
Total	846,572	955,584	1,045,243	1,214,824	1,556,818
Value of natural gas liquids at plants thousand dollars	679,456	689,710	758,496	808,385	782,205
Average value per gallon cents	5.5	5.6	5.6	5.7	5.1
Natural gas processed million cubic feet	8,578,561	8,452,544	9,186,862	9,768,189	10,261,669
Average yield, all natural gas liquids gallons per M cubic feet	1.44	1.46	1.47	1.46	1.48
Shipments for fuel and chemical uses:					
Liquified petroleum gas and ethane (LP-gases)	4,780,141	5,054,271	6,047,061	6,332,699	6,482,109
Liquified refinery gas and ethane (LP-gases)	2,158,980	2,407,818	2,872,100	3,211,950	3,315,774
Total	6,939,121	7,462,089	8,919,161	9,544,649	9,797,883
Exports of natural gasoline, LP-gases, and LR-gases	192,505	120,017	94,620	125,590	149,397
Imports of LP-gases and LR-gases	(3)	(3)	(3)	68,502	75,837

[1] Includes exports of natural gasoline.
[2] Includes exports of LP-gases.
[3] Imports of liquified gases included with gasoline.

gas liquids recovered at pipeline compressor stations and gas-dehydration plants. Such recovery is considered to be of little significance in the national and State totals. Plant condensate is included in the category of natural gas liquids. Field condensate, however, is reported with crude oil and is excluded from the total for natural gas liquids. LR-gases and ethane produced at petroleum refineries are not natural gas liquids, but to obtain complete distribution of liquefied gases, the sales data shown in this chapter cover the products of natural gasoline plants and petroleum refineries.

Data on shipments of LP-gases are collected by the Bureau of Mines from annual reports received from all producers and distributors and from most of the dealers that sell over 100,000 gallons of LP-gases annually. The reported sample of dealer shipments is expanded by Petroleum Administration for Defense (P.A.D.) districts on the basis of the domestic demand in the districts.

Data on shipments of LP-gases used as fuels or chemicals include data on ethane and liquefied gas produced at natual gasoline plants and at petroleum refineries; they exclude, however, data on LP-gases blended into motor fuel.

Liquefied gases and ethane, whether obtained from natural gas or processing in refineries, are defined as follows:

Ethane.—Includes all ethane, ethylene, and mixtures containing more than 50 percent of either.

Propane.—Includes all products covered by NGAA specifications for commercial propane.

Butane-propane mixture.—Includes all products covered by NGAA specifications for commercial butane-propane mixtures.

Butanes.—Includes all products covered by NGAA specifications for commercial butane, except those that contain 60 percent or more isobutane.

Isobutane.—Includes all products covered by NGAA specifications for commercial butane that contain 60 percent or more isobutane.

Other mixtures of liquefied petroleum gases.—Includes mixtures that cannot be classified within the above five classifications, such as mixtures containing less than 50 percent ethane but more than 50 percent propane and butane.

RESERVES

The American Gas Association Reserves Committee has estimated the total proved reserves of natural gas liquids in the United States, as of December 31, 1961, to be 7,049 million barrels, an increase of 233 million barrels for the year. Texas, which accounts for 53

TABLE 2.—Estimated proved recoverable reserves of natural gas liquids [1] in the United States

(Thousand barrels)

State	Reserves as of Dec. 31, 1960	Changes in reserves during 1961			Reserves as of Dec. 31, 1961			
		Extensions and revisions	Discoveries of new fields and new pools in old fields	Net production	Nonassociated with oil	Associated with oil	Dissolved in oil	Total
Arkansas	27,497	−2,778	13	2,499	1,175	12,276	8,782	22,233
California [2]	313,861	46,776	1,082	27,507	0	110,588	223,624	334,212
Colorado	24,024	826	0	4,073	2,932	2,475	15,370	20,777
Illinois	10.053	347	36	1,387	25	0	9,024	9,049
Indiana	110	11	0	19	4	5	93	102
Kansas	198,403	−8,728	596	6,692	173,625	8,294	1,660	183,579
Kentucky	49,052	2,747	1,373	3,377	49,795	0	0	49,795
Louisiana [2]	1,432,975	125,090	31,399	95,626	1,256,623	199,282	37,933	1,493,838
Michigan	1,619	3,198	237	738	695	439	3.182	4,316
Mississippi	36.181	864	312	2,478	25,540	2,978	6,361	34,879
Montana	11,688	57	0	633	2,239	0	8.873	11,112
Nebraska	6,155	−1,715	0	589	2,114	248	1,489	3,851
New Mexico	484,799	45,859	1,249	30,661	327,643	50,078	123.525	501,246
North Dakota	91,218	−5,338	0	1,575	0	7,400	76,905	84,305
Oklahoma	338,313	13,300	4,416	26,849	163,395	46,462	119,323	329,180
Pennsylvania	2,110	15	8	63	2,070	0	0	2,070
Texas [2]	3,596,174	346,607	52,790	240,074	1,722.507	662,797	1,370,193	3,755,497
Utah	50,702	2,019	200	2,503	13,318	0	37,100	50,418
West Virginia	44,734	14,143	7,072	7,711	58,238	0	0	58,238
Wyoming	96,375	7,236	3,366	6,591	50,214	1,357	48,815	100,386
Miscellaneous [3]	16	1	0	4	0	0	13	13
Total	6,816,059	590,537	104.419	461,649	3,852,152	1,104,679	2,092,265	7,049,096

[1] Comprises natural gasoline, LP-gases, and condensate.

[2] Includes offshore reserves.

[3] Includes Alabama and Florida.

percent of the total natural-gas-liquids reserves, reported gains in reserves of 159 million barrels, and Louisiana, with 21 percent of the total, increased reserves 61 million barrels. Reserves increased in 8 States and declined in 14 others. Proved reserves of natural gas liquids can increase both by the discovery of new fields and by the construction of a gasoline plant in an existing field, which insures improved recovery from that field.

PRODUCTION

The 15,191 million gallons of natural gas liquids produced in 1961 was a record high and exceeded the 1960 level by 904 million gallons. Production of LP-gases and ethane increased 641 million gallons, natural gasoline and isopentane increased 187 millon gallons, and other finished products increased 106 million gallons, while the production of finished gasoline and naphtha declined 30 million gallons. Included in the other finished products are raw condensate, kerosene, distillate fuel oil, jet fuel, and miscellaneous finished products.

Propane represented 54 percent of the LP-gases produced in 1961 and totaled 4,484 million gallons, compared with 4,144 million in 1960. Butane (normal) production increased from 2,087 million gallons in 1960 to 2,134 million in 1961, and the production of isobutane increased 109 million gallons in 1961 to 807 million gallons.

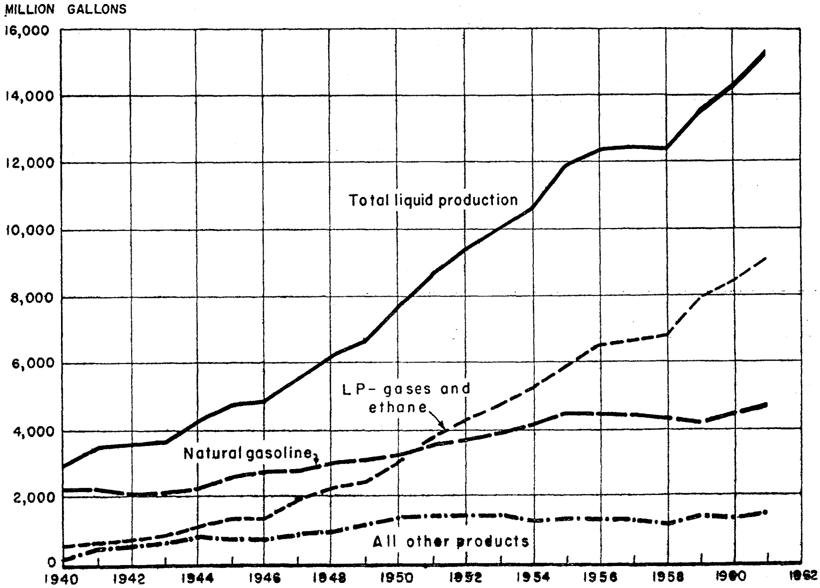

FIGURE 1.—Production of natural gas liquids in the United States, 1940–61.

TABLE 3.—Natural gas liquids produced, value at plants, and gas processed in the United States in 1961, by States

State	Number of operators [2]	Natural gasoline [1]			LP-gases and ethane			Finished gasoline and naphtha		
		Thousand gallons	Thousand dollars	Cents per gallon	Thousand gallons	Thousand dollars	Cents per gallon	Thousand gallons	Thousand dollars	Cents per gallon
Arkansas	5	24,549	1,432	5.8	75.157	3,286	4.4	1,486	126	8.5
California	21	718,499	53,994	7.5	424,767	21,805	5.1	--------	--------	--------
Colorado	8	76,880	3,627	4.7	115,410	5,498	4.8	--------	--------	--------
Illinois	3	16.956	1,311	7.7	340,284	16,495	4.8	--------	--------	--------
Kansas	11	131,235	5,729	4.4	135,643	5,916	4.4	--------	--------	--------
Kentucky [3]	8	27,286	2,130	7.8	266,391	12,598	4.8	--------	--------	--------
Louisiana	38	320.650	21,098	6.6	806,559	33,214	4.1	192,775	12,179	6.3
Mississippi	4	23,521	1,528	6.5	15,510	700	4.5	--------	--------	--------
Montana [4]	5	32,628	1,423	4.4	90.676	2,960	3.3	--------	--------	--------
Nebraska [5]	4	26,506	1,773	6.7	96.083	4,469	4.7	--------	--------	--------
New Mexico	14	293,768	18,036	6.1	656,751	24,154	3.7	--------	--------	--------
Oklahoma	34	471,826	29,831	6.4	817,082	30,141	3.7	1,851	218	11.8
Pennsylvania	3	1,272	74	5.8	1,453	115	7.9	--------	--------	--------
Texas	97	2,394,492	163,233	6.8	4,768,222	185,558	3.9	277,384	19,473	7.0
West Virginia	7	32,645	2,235	6.8	342,646	17,826	5.2	--------	--------	--------
Wyoming	8	73,606	4,512	6.1	132,831	5,451	4.1	--------	--------	--------
Total	182	4,666,319	311,966	6.7	9,085,465	370,186	4.1	473,496	31,996	6.8

State	Other products [6]			Total natural gas liquids			Natural gas processed	
	Thousand gallons	Thousand dollars	Cents per gallons	Thousand gallons	Thousand dollars	Cents per gallon	Million cubic feet	Average yield (gallons per M cubic feet)
Arkansas	1,854	82	4.8	103,046	4,926	4.8	112,490	0.91
California	44,379	3,651	8.2	1,187,645	79,450	6.7	553,734	2.14
Colorado	945	61	6.5	192,290	9,125	4.7	96,177	2.00
Illinois	--------	--------	--------	357,240	17,806	5.0	[7] 198,964	1.80
Kansas	--------	--------	--------	267,823	11,706	4.4	508,213	.53
Kentucky [3]	--------	--------	--------	293,677	14,728	5.0	[7] 295,314	.99
Louisiana	417,751	28,437	6.8	1,737,735	94,928	5.5	1,694,071	1.03
Mississippi	1,614	97	6.0	40,645	2,325	5.7	108,156	.38
Montana [4]	165	10	6.1	123,469	4,393	3.6	55,850	2.21
Nebraska [5]	--------	--------	--------	122,589	6,242	5.1	40.388	3.04
New Mexico	7,636	583	7.6	958.155	42,773	4.5	665.602	1.44
Oklahoma	47,560	3,309	7.0	1,338,319	63,499	4.7	798,653	1.68
Pennsylvania	--------	--------	--------	2,725	189	6.9	2,612	1.04
Texas	439,551	31,573	7.2	7,879,649	399,837	5.1	4,771,916	1.65
West Virginia	1,450	61	7.0	376,741	20,122	5.3	209,753	1.80
Wyoming	2,743	193	7.0	209,180	10,156	4.9	149,776	1.40
Total	965,648	68,057	7.0	15,190,928	782,205	5.1	10,261,669	1.48

[1] Includes isopentane.
[2] A producer operating in more than 1 State is counted but once in arriving at total for United States.
[3] Michigan (3 operators) included in Kentucky.
[4] Utah (3 operators) included in Montana.
[5] North Dakota (1 operator) included in Nebraska.
[6] Includes condensate, kerosene, jet fuel, distillate, etc.
[7] Includes gas from transmission lines, previously treated in another state.

TABLE 4.—Monthly production of natural gas liquids in the United States in 1961, by States and Districts[1]

(Thousand gallons)

States	January	February	March	April	May	June	July	August	September	October	November	December	Total
West Pennsylvania	304	304	329	271	183	190	114	142	178	187	241	282	2, 725
West Virginia	31, 936	29, 085	33, 316	29, 829	31, 658	30. 834	33, 200	31, 567	26, 454	31, 257	31, 231	36, 374	376, 741
Illinois	34, 680	30, 144	29, 087	29, 414	28, 630	30, 300	27, 968	29, 704	29, 477	29, 055	28, 432	30, 349	357, 240
Kentucky and Michigan	25, 425	24, 478	23, 267	23, 747	23, 983	25, 361	23, 492	24, 224	23, 992	24, 989	24, 801	25, 918	293, 677
Kansas	24, 795	21, 517	22, 096	23, 177	20, 182	18, 442	17, 359	17, 731	21, 631	23, 830	27, 144	29, 919	267, 823
Alaska and North Dakota	12, 352	10, 918	10, 456	9, 153	8, 247	8, 301	11, 189	10, 654	10, 259	9, 522	10, 454	11, 084	122, 589
Oklahoma	116, 879	106, 899	113, 783	117, 192	113, 160	104, 707	105, 797	106, 275	103, 426	110, 080	116, 662	123, 459	1, 338, 319
Texas:													
Gulf	184, 922	162, 886	171, 815	166, 037	164, 958	160, 237	168, 514	167, 580	145, 068	180, 211	183, 875	192, 413	2, 048, 516
East Texas	17, 969	16, 925	20, 823	19, 527	18. 855	18, 673	18, 967	19, 200	18, 916	18, 708	17, 708	18, 520	224, 791
Panhandle	107, 844	102, 356	109, 807	100, 860	96, 867	84, 914	93, 784	90, 874	83, 670	112, 101	110, 036	115, 471	1, 208. 584
West Texas	207, 171	186, 714	220, 298	217, 534	216, 280	217, 776	217, 779	220, 100	213, 515	200, 469	208, 839	208, 567	2, 535, 042
Rest of State	162, 232	144, 965	162, 211	155, 168	151, 266	145, 166	150, 492	155, 802	147, 171	160, 147	157, 961	170, 135	1, 862, 716
Total Texas	680, 138	613, 846	684, 954	659, 126	648, 226	626, 766	649, 536	653, 556	608, 340	671, 636	678, 419	705, 106	7, 879, 649
Arkansas	8, 826	8, 439	9, 260	8, 732	8, 592	8, 271	8, 584	8, 374	8, 271	8, 537	8, 255	8, 905	103, 046
Louisiana:													
Gulf	87, 869	96, 530	99, 477	105, 808	97, 830	95, 654	88, 973	94, 716	86, 209	95, 840	98, 640	107, 243	1, 154, 789
Inland	54, 351	49, 010	52, 917	46, 981	43, 830	42, 944	45, 466	47, 183	47, 492	49, 998	49, 508	53, 266	582, 946
Total Louisiana	142, 220	145, 540	152, 394	152, 789	141, 660	138, 598	134, 439	141, 899	133, 701	145, 838	148, 148	160, 509	1, 737, 735
Mississippi	3, 134	2, 957	3, 192	3, 252	3, 222	3, 290	3, 360	3, 588	3, 435	3, 362	3, 861	3, 892	40, 645
New Mexico	79, 333	68, 206	78, 270	74, 548	79, 610	81, 621	87, 693	85, 052	77, 226	79, 476	84, 120	83. 000	958, 155
Colorado	17, 599	15, 482	16, 942	16, 504	18, 505	14, 897	13, 836	13, 809	14, 211	17, 139	17, 029	16, 337	192, 290
Montana and Utah	10, 046	9, 726	9, 376	10, 110	9, 873	11, 995	11, 080	11, 065	10, 805	10, 558	10, 025	8, 810	123, 469
Wyoming	19, 301	16, 751	17, 568	15, 819	16, 973	15, 468	15, 341	16, 380	17, 261	18, 176	19, 900	20, 242	209, 180
California	102. 334	89, 657	102, 261	97, 292	101, 264	95, 792	98, 146	97, 858	95, 217	101, 761	101, 564	104. 499	1, 187, 645
Total United States	1, 309, 302	1, 193, 949	1, 306, 551	1, 270, 955	1, 253, 968	1, 214, 833	1, 241, 134	1, 251, 878	1, 183, 884	1, 285, 403	1, 310, 286	1, 368, 785	15, 190, 928

---

[1] West Pennsylvania separated from eastern part of State to allow grouping either in Bureau of Mines refinery district or Petroleum Administration for defense. Districts shown for Texas and Louisiana are Bureau of Mines production districts.

NATURAL GAS PROCESSED, YIELD, AND NUMBER OF PLANTS

The total number of natural gas liquids plants in operation at the end of 1961 was 598 compared with 560 as of December 31, 1960. Absorption-type plants, which represent 77 percent of the total, produced 82 percent of the natural gas liquids output.

The average yield (gallons per M cubic foot) of natural gas processed was 1.48 in 1961 compared with 1.46 in 1960. A total of 10,262 billion cubic feet of gas was processed at natural gas liquids plants in 1961, 5 percent more than in the preceding year.

TABLE 5.—Natural gas liquids produced in the United States in 1961, by States and methods of production

State	Number of plants operating Dec. 31, 1961				Production (thousand gallons)			
	Compression [1]	Absorption [2]	Cycling [3]	Total	Compression	Absorption	Cycling	Total
Arkansas	----------	5	----------	5	----------	103,046	----------	103,046
California	7	59	2	68	19,498	1,033,207	134,940	1,187,645
Colorado [4]	5	14	----------	19	(5)	(5)	----------	315,759
Illinois [6]	2	4	----------	6	(5)	(5)	----------	385,885
Kansas	1	15	----------	16	(5)	(5)	----------	267,823
Kentucky	----------	3	----------	3	----------	(5)	----------	265,032
Louisiana	10	42	12	64	58,852	1,178,524	500,359	1,737,735
Mississippi	1	3	1	5	(5)	(5)	(5)	40,645
Nebraska [7]	----------	6	----------	6	----------	122,589	----------	122,589
New Mexico	4	26	----------	30	37,702	920,453	----------	958,155
Oklahoma	8	62	2	72	17,577	1,287,010	33,732	1,338,319
Pennsylvania	2	3	----------	5	168	2,557	----------	2,725
Texas	21	203	26	250	217,680	[8] 6,008,500	1,653,469	7,879,649
West Virginia	30	6	----------	36	3,705	373,036	----------	376,741
Wyoming	3	10	----------	13	28,500	180,680	----------	209,180
Total: 1961	94	461	43	598	438,747	12,417,408	2,334,773	15,190,928
1960	73	439	48	560	561,569	11,622,670	2,102,342	14,286,581

[1] Includes 32 plants manufacturing LP-gases; 1 refrigeration-type plant each in Kansas, Mississippi, Oklahoma, West Virginia, and Wyoming; 2 refrigeration-type plants in California; 3 refrigeration-type plants in Colorado; 4 refrigeration-type plants in New Mexico; 6 refrigeration-type plants in Louisiana and 12 in Texas.

[2] Includes combination of absorption and compression process. Includes 354 plants manufacturing LP-gases.

[3] Includes 42 plants manufacturing LP-gases.

[4] Montana (2 absorption plants) and Utah (2 absorption plants) included in Colorado.

[5] Included in state total production and U.S. total production to avoid disclosing individual company operations.

[6] Michigan (2 compression and 1 absorption plants) included in Illinois.

[7] North Dakota (1 absorption plant) included in Nebraska.

[8] Includes some drip gasoline.

DEMAND FOR NATURAL GAS LIQUIDS AT PLANTS AND TERMINALS

The total demand for natural gas liquids at plants and terminals in 1961 was 14,865 million gallons compared with 14,126 million in 1960.

Motor fuel use.—Shipments of natural gas liquids to be used as blending material for motor fuel (54 percent of the total demand) were 7,973 million gallons in 1961, an increase of 451 million gallons for the year. Almost 90 percent was blended into gasoline at petroleum refineries.

TABLE 6.—Supply and distribution at plants and terminals of natural gas liquids in the United States in 1961, by months

(Thousand gallons)

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Production:													
Natural gasoline	348, 377	324, 602	362, 374	359, 682	362, 837	358, 326	378, 386	386, 997	358, 624	371, 816	362, 676	367, 439	4, 342, 136
Ethane	56, 847	49, 984	57, 278	53, 711	54, 863	56, 781	60, 137	61, 870	56, 456	64, 557	64, 370	73, 442	710, 296
LP-gases:													
Propane	408, 196	369, 420	401, 665	381, 744	370, 270	345, 077	340, 614	341, 405	341, 599	373, 565	396, 668	413, 567	4, 483, 790
Butane, normal	191, 110	173, 171	189, 011	181, 880	175, 327	174, 206	172, 452	154, 536	150, 898	180, 364	190, 513	200, 715	2, 134, 183
Isobutane	67, 838	61, 195	68, 189	66, 494	63, 769	61, 087	61, 053	71, 309	67, 219	73, 177	70, 666	74, 916	806, 912
Butane-propane mixture	50, 546	49, 973	49, 943	54, 874	55, 763	54, 724	58, 284	66, 307	48, 941	49, 530	45, 085	50, 898	634, 868
Other LP-gases mixture	24, 640	23, 580	24, 549	25, 700	27, 561	26, 163	27, 977	23, 946	20, 632	30, 346	29, 898	30, 424	315, 416
Isopentane	28, 779	27, 066	29, 841	28, 009	28, 551	26, 908	25, 940	25, 067	25, 724	26, 296	25, 188	26, 814	324, 183
Finished gasoline and naphtha	44, 050	38, 931	42, 653	38, 840	39, 003	35, 829	37, 107	39, 443	37, 111	38, 195	39, 535	42, 799	473, 496
Condensate, raw	71, 681	60, 679	65, 777	64, 239	62, 313	61, 357	62, 724	62, 636	58, 770	62, 418	69, 565	71, 192	773, 351
Other finished products	17, 238	15, 348	15, 271	15, 782	13, 711	14, 375	16, 460	18, 362	17, 910	15, 139	16, 122	16, 579	192, 297
Total	1, 309, 302	1, 193, 949	1, 306, 551	1, 270, 955	1, 253, 968	1, 214, 833	1, 241, 134	1, 251, 878	1, 183, 884	1, 285, 403	1, 310, 286	1, 368, 785	15, 190, 928
Stock change at plants and terminals	−200, 302	−37, 178	+179, 606	+167, 233	+142, 432	+121, 695	+137, 551	+61, 398	+64, 712	−5, 154	−98, 860	−206, 763	+326, 370
Shipments:													
For use in gasoline:													
Natural gasoline	345, 278	327, 832	345, 183	347, 352	380, 793	374, 813	385, 496	391, 840	349, 814	374, 262	365, 866	361, 044	4, 349, 573
LP-gases:													
Propane	4, 032	3, 192	714	588	3, 654	3, 528	3, 360	3, 192	3, 696	4, 536	7, 392	5, 754	43, 638
Butane, normal	137, 472	92, 324	94, 192	71, 680	81, 271	79, 786	88, 569	66, 845	74, 948	112, 909	154, 041	168, 270	1, 222, 307
Isobutane	52, 410	44, 764	48, 734	50, 456	56, 279	58, 520	49, 905	73, 561	63, 064	62, 735	63, 519	59, 748	683, 695
Butane-propane mixture	336	--------	--------	420	2, 856	504	84	588	336	210	--------	5, 292	10, 626
Other LP-gases mixture	5, 964	5, 796	7, 014	6, 342	6, 468	8, 358	8, 526	7, 560	8, 232	10, 332	6, 762	6, 720	88, 074
Isopentane	29, 649	26, 376	29, 529	28, 788	27, 734	26, 563	26, 084	25, 623	25, 004	27, 148	25, 037	26, 016	323, 551
Finished gasoline and naphtha	38, 556	37, 952	42, 952	39, 796	40, 266	40, 599	38, 629	38, 743	37, 602	41, 357	42, 861	39, 958	479, 271
Condensate	70, 200	62, 089	65, 739	64, 468	63, 196	59, 976	62, 616	63, 692	59, 251	62, 123	67, 116	71, 961	772, 427
For other uses:													
Ethane	58, 641	49, 996	57, 278	53, 711	54, 863	56, 781	60, 137	61, 870	56, 456	64, 557	64, 370	73, 442	712, 102
LP-gases:													
Propane	586, 256	428, 342	304, 845	309, 996	282, 135	265, 237	244, 353	281, 719	262, 231	324, 179	397, 305	550, 171	4, 236, 769
Butane, normal	79, 546	62, 444	44, 416	41, 084	38, 704	34, 010	46, 727	76, 126	93, 668	109, 560	126, 983	109, 063	832, 331
Isobutane	4, 774	4, 077	4, 439	4, 596	5, 126	5, 331	4, 546	6, 701	5, 745	5, 715	5, 786	5, 443	62, 279
Butane-propane mixture	57, 105	50, 624	49, 834	52, 619	50, 586	51, 752	55, 788	67, 296	44, 317	51, 895	46, 271	48, 184	626, 271
Other LP-gas mixtures	17, 902	19, 209	16, 076	16, 834	2, 729	15, 961	10, 773	6, 022	19, 667	22, 990	19, 751	25, 907	193, 821
Other finished products	21, 483	16, 110	16, 000	14, 992	14, 876	11, 419	17, 990	19, 102	15, 141	16, 049	16, 086	18, 575	197, 823
Total demand for natural gas liquids at plants and terminals	1, 509, 604	1, 231, 127	1, 126, 945	1, 103, 722	1, 111, 536	1, 093, 138	1, 103, 583	1, 190, 480	1, 119, 172	1, 290, 557	1, 409, 146	1, 575, 548	14, 864, 558

Other uses.—The demand for ethane increased 16 percent in 1961. All ethane is used in the production of chemicals. The LP-gases shipped for uses other than motor fuel are used as fuel or in the manufacture of chemicals. These shipments totaled 5,981 million gallons in 1961 compared with 5,778 million in 1960. Of the 198 million gallons reported as deliveries of other finished products, 46 percent is miscellaneous finished products, 26 percent is kerosene, 15 percent is jet fuel, and 13 percent is distillate fuel oil. Details of the uses of liquefied gases are shown in this chapter in the section entitled "Shipments of Liquefied Petroleum Gases and Ethane."

TABLE 7.—Natural-gas liquids utilized at refineries in the United States in 1961, by Bureau of Mines refinery districts and by months

(Thousand gallons)

District	January	February	March	April	May	June	July	August	September	October	November	December	Total
East Coast	11,382	6,342	4,032	6,594	3,360	1,344	4,788	8,274	6,846	7,434	7,854	15,498	83,748
Appalachian	588	336	462	168	672	252	210	168	42	546	588	1,092	5,124
Indiana, Illinois, Kentucky, etc	50,484	44,100	44,730	43,554	41,370	32,340	42,336	44,478	47,544	59,430	63,336	59,934	573,636
Minnesota Wisconsin North Dakota and South Dakota	4,578	2,730	2,856	2,982	1,638	3,486	3,696	4,032	2,730	3,780	4,326	3,864	40,698
Oklahoma, Kansas, Missouri	68,964	57,624	63,630	58,884	58,800	59,976	63,462	62,286	61,698	73,290	71,064	72,240	771,918
Texas:													
Inland	97,566	77,448	91,980	88,662	98,616	96,516	86,268	75,054	70,560	76,650	81,480	72,156	1,012,956
Gulf Coast	185,430	155,400	166,110	160,440	180,432	187,278	194,040	191,436	172,200	215,040	229,698	219,534	2,257,038
Total Texas	282,996	232,848	258,090	249,102	279,048	283,794	280,308	266,490	242,760	291,690	311,178	291,690	3,269,994
Louisiana-Arkansas:													
Louisiana Gulf Coast	72,324	61,824	54,558	56,112	58,758	53,592	59,892	62,622	64,092	65,184	71,106	73,290	753,354
Arkansas, Louisiana Inland	29,988	27,342	30,408	29,526	29,064	27,426	26,796	28,770	27,468	28,476	29,694	31,332	346,290
Total Louisiana-Arkansas	102,312	89,166	84,966	85,638	87,822	81,018	86,688	91,392	91,560	93,660	100,800	104,622	1,099,644
New Mexico	2,940	2,562	2,856	2,982	3,234	3,780	3,696	4,536	4,872	4,494	3,948	3,696	43,596
Other Rocky Mountain	13,272	11,382	12,852	11,634	12,180	12,348	12,180	12,012	11,718	12,474	13,608	14,406	150,066
West Coast	92,610	80,262	87,822	84,882	91,938	91,434	89,208	91,770	88,662	91,224	91,014	90,426	1,071,252
Total United States	630,126	527,352	562,296	546,420	580,062	569,772	586,572	585,438	558,432	638,022	667,716	657,468	7,109,676

TABLE 8.—Percentage of natural gas liquids in refinery gasoline[1] in the United States, by Bureau of Mines refinery districts

Year	East Coast	Appalachian	Indiana, Illinois, Kentucky, etc.	Minnesota, Wisconsin, North Dakota and South Dakota	Oklahoma, Kansas-Missouri, etc.	Texas Inland	Texas Gulf Coast	Louisiana Gulf Coast	Arkansas, Louisiana Inland	Rocky Mountain	West Coast	Total
1957	1.3	(2)	5.6	1.5	9.7	34.3	12.7	17.6	4.6	5.8	14.0	10.6
1958	1.3	(2)	4.8	1.7	9.3	34.8	13.4	8.4	13.1	5.6	13.4	9.7
1959	1.2	(2)	4.4	3.3	10.6	35.6	14.4	11.0	25.3	6.7	12.5	10.4
1960	1.0	(2)	5.3	3.6	11.1	35.6	13.5	13.0	35.7	7.8	13.4	11.0
1961	1.1	(2)	4.9	4.6	12.4	30.9	15.2	13.4	33.9	8.5	12.7	11.2

[1] Refinery gasoline excludes jet fuel.

[2] Less than 0.5 percent.

TABLE 9.—Liquefied petroleum gas and ethane produced at natural gas processing plants in 1961

(Thousand gallons)

States and area	Propane	Butane-propane mix	Butane	Isobutane	Other LP-gas	Total
West Pennsylvania	1,093	194	166	---	---	1,453
West Virginia	79,915	---	39,077	---	[1] 223,654	342,646
Illinois	162,379	399	6,647	15,307	[1] 155,552	340,284
Kansas	57,940	9,034	50,606	18,063	---	135,643
Kentucky	[2] 60,728	---	16,440	17,290	[1] [2] 171,933	[2] 266,391
Michigan	(2)	---	---	---	(2)	(2)
Nebraska	60,386	7,801	27,896	---	---	[3] 96,083
North Dakota	(3)	(3)	(3)	---	---	(3)
Oklahoma	512,560	61,302	190,364	50,631	2,225	817,082
Arkansas	44,145	12,081	8,878	10,053	---	75,157
Louisiana:						
Gulf	316,352	25,521	119,400	76,365	[1] 21,687	559,325
Inland	123,265	67,585	32,103	24,281	---	247,234
Total Louisiana	439,617	93,106	151,503	100,646	21,687	806,559
Mississippi	9,493	3,592	2,425	---	---	15,510
New Mexico	342,106	21,765	242,717	43,143	7,020	656,751
Texas:						
Gulf	352,304	48,334	206,579	197,272	[1] 269,474	1,073,963
West	1,092,142	143,388	519,315	90,157	[1] 6,893	1,851,895
East	83,860	3,765	28,150	675	10,371	126,821
Panhandle	297,533	25,212	259,830	142,093	19,495	744,163
Other	393,994	174,851	212,366	94,580	[1] 95,589	971,380
Total Texas	2,219,833	395,550	1,226,240	524,777	[1] 401,822	4,768,222
Colorado	75,285	---	29,428	---	10,697	115,410
Montana	[4] 49,871	3,585	[4] 37,220	---	---	[4] 90,676
Utah	(4)	---	(4)	---	---	(4)
Wyoming	83,552	---	48,251	---	1,028	132,831
California	284,887	26,459	56,325	27,002	30,094	424,767
Grand total	4,483,790	634,868	2,134,183	806,912	[5] 1,025,712	9,085,465

[1] Includes ethane production.

[2] Michigan included with Kentucky.

[3] North Dakota included with Nebraska.

[4] Utah included with Montana.

[5] Includes 710,296,000 gallons of ethane production.

TABLE 10.—Liquefied petroleum gas and ethane produced at refineries in 1961

(Thousand gallons)

States and Areas	Propane	Butane-propane mix	Butane	Other LR-gases	Total
East Coast [1]	226,506	---	33,012	[2] 46,452	305,970
West New York	19,908	336	---	42	20,286
Pennsylvania	129,864	---	2,100	---	131.964
West Virginia	---	---	---	1,302	1,302
Illinois	149.940	−504	5,712	−252	154,896
Indiana	36,750	−1,260	---	−84	35,406
Kansas	52,500	1,386	26,502	---	80,388
Kentucky	[3] 17,934	---	---	---	[3] 17,934
Michigan	37,128	---	84	[2] 6,426	43,638
Tennessee	(3)	---	---	---	(3)
Minnesota	(4)	(4)	(4)	(4)	(4)
Missouri	(4)	---	---	---	(4)
Nebraska	[4] 39,984	[4] 210	1,554	[4] 210	[4] 41,958
North Dakota	(4)	---	(4)	---	(4)
Ohio	127,554	---	3,570	168	131,292
Oklahoma	90,342	70,770	28,560	252	189,924
Alabama	---	(5)	---	---	(5)
Arkansas	(5)	(5)	(5)	(5)	(5)
Louisiana:					
Gulf	206,892	23.016	41,034	[2] 339,402	610.344
Inland	---	3.444	---	---	3,444
Total	206,892	26,460	41,034	[2] 339,402	613,788
Mississippi	[5] 23,478	[5] 1,176	[5] 7,896	[5] 2,478	[5] 35,028
New Mexico	2,562	---	3,612	---	6,174
Texas:					
Gulf	347,592	1,722	230,160	[2] 292,656	872,130
Inland	84,210	8,820	52,500	4,284	149,814
Total	431,802	10,542	282,660	296,940	1,021,944
Colorado	6,972	---	4,704	---	11.676
Montana	9,114	---	4,704	---	13.818
Utah	18,564	---	4,620	---	23,184
Wyoming	3,486	---	8,400	630	12,516
California	277,116	13,734	97,776	[2] 34,062	422,688
Grand total	1,908,396	122,850	556,500	[6] 728,028	3,315,774

[1] Excludes Pennsylvania.
[2] Includes ethane production.
[3] Tennessee included with Kentucky.
[4] Minnesota, Missouri, and North Dakota included with Nebraska.
[5] Alabama and Arkansas included with Mississippi.
[6] Includes 369,432,000 gallons of ethane production.

SHIPMENTS[5] OF LIQUEFIED PETROLEUM GASES[6] AND ETHANE

Shipments of LP-gases for domestic use, excluding LP-gases used in gasoline, increased 3 percent in 1961, compared with a 7 percent increase in 1960. Percent changes from 1960 in the various categories were as follows:

	Percent change
Domestic and commercial	+2
Internal combustion	−2
Industrial	−8
Refinery fuel	+6
Gas manufacture	+8
Chemical manufacture	+7
Synthetic-rubber manufacture	−4
Secondary recovery	−3
All other uses	−13

TABLE 11.—Shipments of LP-gases[1] and ethane in the United States, by types

(Thousand gallons)

Year	Ethane	Percent of total	Propane	Percent of total	Butane	Percent of total	Isobutane	Percent of total	Butane-propane mixtures	Percent of total	All other mixtures	Percent of total	Total LP-gas and ethane	Total percent
1957	(2)	----------	4,009,144	57.8	1,117,748	16.1	26,721	0.4	934,183	13.5	851,325	12.2	6,939,121	100.0
1958	(2)	----------	4,247,373	56.9	1,119,544	15.0	25,805	0.3	1,050,086	14.1	1,019,281	13.7	7,462,089	100.0
1959	783,789	8.8	5,132,194	57.5	1,298,487	14.6	11,086	0.1	1,143,284	12.8	550,321	6.2	8,919,161	100.0
1960	965,175	10.1	5,743,694	60.2	1,099,544	11.5	15,959	0.1	1,093,511	11.5	626,766	6.6	9,544,649	100.0
1961	1,075,957	11.0	5,935,967	60.6	1,065,513	10.9	62,279	0.6	1,107,329	11.3	550,838	5.6	9,797,883	100.0

[1] Data include LR-gases but exclude LP-gases blended into gasoline.
[2] Not reported separately before 1959.

---

[5] The terms "shipments" has been substituted for the term "sales", previously used in this chapter, as being more inclusive and more descriptive of the transactions reported.

[6] Data include LR-gases but exclude LP-gases blended into gasoline. The survey covering shipments of LP-gases in the West Coast marketing area (P.A.D. district 5) was made by Frank A. Moore, Division of Mineral Resources, Bureau of Mines, San Francisco, Calif.

TABLE 12.—Shipments of LP-gases[1] and ethane in the United States, by uses

(Thousand gallons)

Year	Domestic and commercial	Internal combustion	Industrial	Refinery fuel	Gas manufacturing	Chemical	Synthetic rubber	Used in the secondary recovery of petroleum	All Other	Total
1957	3,067,070	805,056	441,474	122,405	231,155	1,732,338	418,189	68,557	52,877	6,939,121
1958	3,293,677	852,387	492,862	179,231	238,911	1,898,862	371,961	68,981	65,217	7,462,089
1959	3,934,792	889,698	439,200	136,830	182,903	2,525,910	513,941	231,134	64,753	8,919,161
1960	4,224,537	897,915	438,659	157,036	157,041	3,019,011	538,971	53,240	58,239	9,544,649
1961	4,318,215	880,315	402,428	166,572	168,989	3,239,479	519,637	51,683	50,565	9,797,883

[1] Data include LR-gases but exclude LP-gases blended into gasoline.

TABLE 13.—Shipments of LP-gases [1] and ethane in the United States, by P.A.D. districts, States, and uses

(Thousand gallons)

District and State	Domestic and commercial		Internal combustion		Industrial		Refinery fuel		Gas manufacturing	
	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961
District 1:										
Connecticut	30,854	30,495	350	655	8,436	9,376	(2)	(2)	1,465	2,424
Delaware	8,694	10,769	414	157	2,456	2,452			7	242
Florida	170,871	170,642	15,005	16,982	7,475	6,689			12,736	12,316
Georgia	112,596	114,491	12,014	13,873	8,262	5,455			15,717	9,108
Maine	16,912	18,642	132	150	891	986			99	9
Maryland and D.C	30,498	33,373	1,598	1,829	3,980	4,135			6,215	3,877
Massachusetts	37,135	32,927	718	653	3,976	4,486			5,171	7,103
New Hampshire	20,354	18,054	20	20	947	1,183			1,012	1,257
New Jersey	36,435	32,690	1,115	1,252	18,007	16,730			2,482	2,557
New York	105,263	103,891	3,309	3,918	9,990	8,526			985	1,580
North Carolina	79,810	79,182	980	1,179	9,859	8,296			787	538
Pennsylvania	55,565	56,761	3,586	3,541	24,433	27,091			1,018	4,993
Rhode Island	7,362	7,367	256	306	881	826			208	281
South Carolina	45,745	43,378	2,445	2,546	6,544	6,007			944	1,058
Vermont	12,771	13,139	27	25	1,362	899			2,786	3,812
Virginia	36,279	39,208	1,316	1,641	3,803	4,473			5,158	5,579
West Virginia	11,173	14,527	321	274	1,039	825			128	127
Total	818,317	819,536	43,606	49,001	112,341	108,435	29,358	18,480	56,918	56,861
District 2:										
Illinois	256,538	244,599	57,938	54,396	40,507	38,004	(2)	(2)	4,904	7,410
Indiana	167,476	164,657	8,649	8,579	43,502	42,717			11,798	4,832
Iowa	163,644	162,537	4,154	2,935	4,939	4,555			1,319	1,023
Kansas	170,313	180,773	39,354	36,605	7,423	5,262			----------	----------
Kentucky	68,980	64,671	6,183	5,612	3,109	1,696			----------	5,730
Michigan	95,835	93,155	3,881	3,936	11,852	10,821			995	1,743
Minnesota	153,576	155,053	4,971	4,430	24,663	21,254			5,327	5,952
Missouri	231,574	249,720	7,891	7,205	9,369	6,663			289	4,686
Nebraska	88,459	95,842	18,848	15,555	1,343	1,353			774	987
North Dakota	38,887	39,248	5,340	4,897	2,712	4,392			3,956	3,612
Ohio	86,473	92,558	6,608	6,162	11,231	10,774			8,253	13,314
Oklahoma	194,592	200,579	53,143	59,352	7,810	10,502			----------	----------
South Dakota	52,732	53,887	3,954	4,118	602	1,467			50	----------
Tennessee	42,582	44,033	4,004	3,693	6,615	4,996			1,649	1,983
Wisconsin	132,172	133,313	4,239	4,602	35,888	31,097			5,998	6,202
Total	1,943,833	1,974,625	229,157	222,077	211,565	195,553	68,502	96,096	45,312	57,474

District 3:										
Alabama	103,828	111,938	5,606	4,929	3,055	3,059	(2)	(2)	------------	------------
Arkansas	139,901	149,504	56,629	60,482	5,238	4,032			------------	39
Louisiana	77,413	86,498	36,121	48,527	15,925	14,974			------------	------------
Mississippi	121,044	127,597	40,363	41,218	2,325	1,819			------------	10
New Mexico	71,194	84,818	22,821	23,947	4,210	648			2,888	2,376
Texas	498,197	499,320	371,217	356,808	34,124	31,486			993	834
Total	1,011,577	1,059,675	532,757	535,911	64,877	56,018	17,177	12,894	3,881	3,259
District 4:										
Colorado	103,596	102,753	17,103	10,115	1,373	3,115	(2)	(2)	766	2,037
Idaho	15,503	15,792	1,281	1,510	2,321	3,773			------------	------------
Montana	25,015	30,429	5,245	4,975	669	452			------------	------------
Utah	12,297	16,220	6,400	5,540	256	755			------------	------------
Wyoming	27,731	29,012	12,824	12,361	2,756	2,697			------------	------------
Total	184,142	194,206	42,853	34,501	7,375	10,792	10,038	11,634	766	2,037
District 5:										
Alaska	1,767	3,296	------------	------------	------------	------------	(2)	(2)	107	97
Arizona	19,624	25,865	6,321	5,315	4,361	211			------------	23
California	186,660	188,970	39,158	29,160	20,860	25,183			21,015	20,918
Hawaii	2,835	3,720	330	375	117	76			1,420	1,687
Nevada	13,573	16,964	875	1,453	172	208			17,859	19,027
Oregon	25,052	12,531	1,783	1,532	13,558	4,018			8,406	7,606
Washington	17,157	18,827	1,075	990	3,433	1,934			1,357	------------
Total	266,668	270,173	49,542	38,825	42,501	31,630	31,961	27,468	50,164	49,358
Total U.S. shipments	4,224,537	4,318,215	897,915	880,315	438,659	402,428	157,036	166,572	157,041	168,989

See footnotes at end of table.

TABLE 13.—Shipments of LP-gases [1] and ethane in the United States, by P.A.D. districts, States, and uses—Continued

(Thousand gallons)

District and State	Chemical		Synthetic rubber		Used in the secondary recovery of petroleum		All other		Total	
	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961
District 1:										
Connecticut	(2)	(2)	------------	------------	------------	------------	2,743	1,206	43,848	44,156
Delaware							163	43	11,734	13,663
Florida							1,173	684	207,260	207,313
Georgia							3,664	3,077	152,253	146,004
Maine							55	52	18,089	19,839
Maryland and D.C							42	50	42,333	43,264
Massachusetts							858	337	47,858	45,506
New Hampshire							------------	31	22,333	20,545
New Jersey							20	13	58,059	53,242
New York							112	93	119,659	118,008
North Carolina							6,907	7,468	98,343	96,663
Pennsylvania							91	145	84,693	92,531
Rhode Island							------------	------------	8,707	8,780
South Carolina							1,307	1,611	56,985	54,600
Vermont							------------	------------	16,946	17,875
Virginia							639	444	47,195	51,345
West Virginia							------------	------------	12,661	15,753
Total	429,572	440,706	------------	------------	------------	------------	17,774	15,254	[3] 1,507,886	[3] 1,508,273
District 2:										
Illinois	(2)	(2)	------------	------------	(2)	(2)	1,996	2,387	361,883	346,796
Indiana							913	1,044	232,338	221,829
Iowa							2,696	1,607	176,752	172,657
Kansas							667	1,018	217,757	223,658
Kentucky							51	72	78,323	77,781
Michigan							460	407	113,023	110,062
Minnesota							1,476	1,020	190,013	187,709
Missouri							538	396	249,661	268,670
Nebraska							1,875	631	111,299	114,368
North Dakota							------------	788	50,895	52,937
Ohio							413	644	112,978	123,452
Oklahoma							2,972	1,059	258,517	271,492
South Dakota							199	106	57,537	59,578
Tennessee							188	339	55,038	55,044
Wisconsin							518	600	178,815	175,814
Total	299,606	324,485	------------	------------	153	994	14,962	12,118	[3] 2,813,090	[3] 2,883,422

District 3:										
Alabama	(2)	(2)	(2)	(2)	(2)	(2)	142	150	112,631	120,076
Arkansas							770	1,871	202,538	215,928
Louisiana							4,555	1,468	134,014	151,467
Mississippi							1,620	1,375	165,352	172,019
New Mexico							2,719	700	103,832	112,489
Texas							9,526	8,913	914,057	897,361
Total	2,180,522	2,344,406	513,660	501,931	19,335	6,004	19,332	14,477	[3] 4,363,118	[3] 4,534,575
District 4:										
Colorado	----------	----------	----------	----------	(2)	(2)	826	1,003	123,664	119,023
Idaho							5	50	19,110	21,125
Montana							----------	112	30,929	35,968
Utah							7	----------	18,960	22,515
Wyoming							45	28	43,356	44,098
Total	----------	----------	----------	----------	1,748	3,861	883	1,193	[3] 247,805	[3] 258,224
District 5:										
Alaska	(2)	(2)	(2)	(2)	(2)	(2)	48	----------	1,922	3,393
Arizona							87	261	30,393	31,675
California							5,062	7,168	272,755	271,399
Hawaii							----------	----------	4,702	5,858
Nevada							----------	----------	32,479	37,652
Oregon							91	94	48,890	25,781
Washington							----------	----------	23,022	21,751
Total	109,311	129,882	25,311	17,706	32,004	40,824	5,288	7,523	[3] 612,750	[3] 613,389
Total U.S. shipments	3,019,011	3,239,479	538,971	519,637	53,240	51,683	58,239	50,565	9,544,649	9,797,883

---

[1] Data include LR-gases but exclude LP-gases blended into gasoline.

[2] Individual States not shown to avoid disclosing individual company data.

[3] Refinery fuel use, chemical, synthetic rubber and use for secondary recovery included in district totals only.

TABLE 14.—Shipments of LP-gases[1] and ethane in the United States, by P.A.D. districts and States

(Thousand gallons)

District and State	Total LP-gases and ethane														Percent change
	Ethane		Propane		Butane		Isobutane		Butane-propane mixtures		All other mixtures		Total LP-gases and ethane		
	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961	
District 1:															
Connecticut	(2)	(2)	43,577	44,112	259	10	(2)	(2)	12	34	(2)	(2)	43,848	44,156	0.7
Delaware			11,697	13,624	--------	--------			37	39			11,734	13,663	16.4
Florida			162,964	166,048	2,363	1,707			41,933	39,558			207,260	207,313	--------
Georgia			116,090	110,545	4,584	3,399			31,579	32,060			152,253	146,004	−4.1
Maine			18,089	19,839	--------	--------			--------	--------			18,089	19,839	9.7
Maryland and D.C			42,315	43,030	--------	--------			18	234			42,333	43,264	2.2
Massachusetts			47,441	44,219	123	1,287			294	--------			47,858	45,506	−4.9
New Hampshire			22,003	20,135	330	410			--------	--------			22,333	20,545	−8.0
New Jersey			58,039	53,242	--------	--------			20	--------			58,059	53,242	−8.3
New York			116,847	115,747	11	17			2,801	2,244			119,659	118,008	−1.4
North Carolina			95,576	94,271	90	54			2,677	2,338			98,343	96,663	−1.7
Pennsylvania			76,003	81,889	4,914	7,026			3,776	3,616			84,693	92,531	9.3
Rhode Island			8,707	8,780	--------	--------			--------	--------			8,707	8,780	0.8
South Carolina			44,071	43,140	92	80			12,822	11,380			56,985	54,600	−4.2
Vermont			16,946	17,875	--------	--------			--------	--------			16,946	17,875	5.5
Virginia			46,610	50,920	418	425			167	--------			47,195	51,345	8.8
West Virginia			11,744	15,016	890	712			27	25			12,661	15,753	24.4
Total	[3] 343,676	[3] 346,822	[3] 975,548	[3] 978,497	[3] 72,607	[3] 72,563	--------	[3] 364	[3] 100,111	[3] 93,995	[3] 15,944	[3] 16,032	[3] 1,507,886	[3] 1,508,273	--------
District 2:															
Illinois	(2)	(2)	355,390	337,566	3,904	6,371	(2)	(2)	2,589	2,859	(2)	(2)	361,883	346,796	−4.2
Indiana			199,937	217,084	30,471	4,012			1,930	733			232,338	221,829	−4.5
Iowa			174,488	171,782	1,277	760			987	115			176,752	172,657	−2.3
Kansas			179,042	187,906	17,732	16,070			20,983	19,682			217,757	223,658	2.7
Kentucky			75,437	75,441	703	285			2,183	2,055			78,323	77,781	−0.7
Michigan			112,828	109,962	195	100			--------	--------			113,023	110,062	−2.6
Minnesota			179,981	182,371	9,922	5,128			110	210			190,013	187,709	−1.2
Missouri			238,521	255,654	3,500	4,074			7,640	8,942			249,661	268,670	7.6
Nebraska			107,146	111,433	1,991	1,712			2,162	1,223			111,299	114,368	2.8
North Dakota			46,350	47,065	3,625	4,245			920	1,627			50,895	52,937	4.0
Ohio			112,699	123,226	143	191			136	35			112,978	123,452	9.3
Oklahoma			187,138	197,413	25,397	25,318			45,982	48,761			258,517	271,492	5.0
South Dakota			56,634	58,194	611	482			292	902			57,537	59,578	3.5
Tennessee			49,730	49,527	1,320	1,291			3,988	4,226			55,038	55,044	--------
Wisconsin			161,937	161,519	13,655	12,346			3,223	1,949			178,815	175,814	−1.7
Total	[3] 225,677	[3] 225,494	[3] 2,268,862	[3] 2,341,334	[3] 169,647	[3] 188,170	--------	[3] 5,782	[3] 101,759	[3] 105,792	[3] 47,145	[3] 16,850	[3] 2,813,090	[3] 2,883,422	2.5

District 3:															
Alabama	(2)	(2)	78,781	86,831	3,027	3,631	(2)	(2)	30,823	29,614	(2)	(2)	112,631	120,076	6.6
Arkansas			120,878	156,013	9,816	10,799			71,844	49,116			202,538	215,928	6.6
Louisiana			48,784	64,534	11,697	10,343			73,533	76,590			134,014	151,467	13.0
Mississippi			83,393	93,481	10,956	8,551			71,003	69,987			165,352	172,019	4.0
New Mexico			90,641	96,624	1,418	2,641			11,773	13,224			103,832	112,489	8.3
Texas			377,710	375,663	68,686	65,244			467,661	456,454			914,057	897,361	−1.8
Total	[3] 395,822	[3] 495,661	[3] 1,823,848	[3] 1,925,421	[3] 808,398	[3] 768,103	[3] 15,959	[3] 56,133	[3] 814,945	[3] 845,620	[3] 504,146	[3] 443,637	[3] 4,363,118	[3] 4,534,575	3.9
District 4:															
Colorado			117,595	113,863	1,355	1,405			4,714	3,755			123,664	119,023	−3.8
Idaho			19,110	21,125	----------	----------			----------	----------			19,110	21,125	10.5
Montana			27,922	33,233	1,719	1,367			1,288	1,368			30,929	35,968	16.3
Utah			16,739	21,627	149	4			2,072	884			18,960	22,515	18.8
Wyoming			34,095	35,828	742	595			8,519	7,675			43,356	44,098	1.7
Total	--------	--------	[3] 218,713	[3] 229,662	[3] 12,499	[3] 11,580	--------	--------	16,593	[3] 16,982	--------	--------	247,805	[3] 258,224	4.2
District 5:															
Alaska	(2)	(2)	1,922	3,393	(2)	(2)	--------	--------	----------	----------	(2)	(2)	1,922	3,393	76.5
Arizona			24,939	29,481					5,454	2,194			30,393	31,675	4.2
California			224,990	235,040					47,765	36,359			272,755	271,399	−0.5
Hawaii			43	93					4,659	5,765			4,702	5,858	24.6
Nevada			32,466	37,584					13	68			32,479	37,652	15.9
Oregon			48,104	25,781					786	----------			48,890	25,781	−47.3
Washington			21,596	21,364					1,426	554			23,022	21,918	−4.8
Total	--------	[3] 7,980	[3] 456,723	[3] 461,053	[3] 36,393	[3] 25,097	--------	--------	60,103	44,940	[3] 59,531	[3] 74,319	[3] 612,750	[3] 613,389	0.1
Total U.S. shipments	965,175	1,075,957	5,743,694	5,935,967	1,099,544	1,065,513	15,959	62,279	1,093,511	1,107,329	626,766	550,838	9,544,649	9,797,883	2.7

---

[1] Data include LR-gases but exclude LP-gases blended into gasoline.

[2] Individual states not shown to avoid disclosing individual company data.

[3] Refinery fuel use, chemical, synthetic rubber and use for secondary recovery included in district totals only.

STOCKS

Stocks of natural gas liquids increased 342 million gallons during 1961 and at the end of the year totaled 1,557 million gallons. Stocks of LP-gases and ethane at underground storage facilities increased from 709 million gallons on December 31, 1960, to 1,041 million a year later, a gain of almost 47 percent.

TABLE 15.—Stocks of natural gas liquids in the United States

(Thousand gallons)

Date	Natural gasoline and isopentane		LP-gases and ethane		Other finished products and plant condensate		Total at plants and terminals	Total at refineries[1]	Grand total[1]
	At plants and terminals	At refineries[1]	At plants and terminals	At refineries	At plants and terminals	At refineries			
Dec. 31:									
1957	121,414	46,830	546,005	22,596	94,481	15,246	761,900	84,672	846,572
1958	156,788	41,496	634,885	29,820	80,289	12,306	871,962	83,622	955,584
1959	128,100	41,958	767,143	23,436	72,426	12,180	967,669	77,574	1,045,243
1960	143,295	54,264	920,340	26,418	64,543	5,922	1,128,178	86,604	1,214,872
1961									
Jan. 31	145,524	47,082	715,079	26,418	67,273	5,838	927,876	79,338	1,007,214
Feb. 28	142,984	51,870	681,634	24,948	66,080	6,678	890,698	83,496	974,194
Mar. 31	160,487	53,508	844,727	25,284	65,090	7,896	1,070,304	86,688	1,156,992
Apr. 30	172,038	55,902	1,000,804	22,218	64,695	10,668	1,237,537	88,788	1,326,325
May 31	154,809	67,074	1,163,686	23,016	61,384	16,674	1,379,969	106,764	1,486,733
June 30	138,757	64,806	1,301,956	26,418	60,951	10,962	1,501,664	102,186	1,603,850
July 31	131,503	65,562	1,449,705	25,200	58,007	9,702	1,639,215	100,464	1,739,679
Aug. 31	126,104	61,782	1,517,598	24,360	56,911	10,080	1,700,613	96,222	1,796,835
Sept. 30	135,634	64,092	1,570,983	24,906	58,708	10,668	1,765,325	99,666	1,864,991
Oct. 31	132,336	57,750	1,572,904	26,124	54,931	10,248	1,760,171	94,122	1,854,293
Nov. 30	129,297	50,988	1,477,924	30,492	54,090	7,182	1,661,311	88,662	1,749,973
Dec. 31	136,490	62,118	[2] 1,263,892	30,198	54,166	9,954	1,454,548	102,270	1,556,818

[1] Includes benzol from nonpetroleum sources prior to 1960.
[2] Includes 1,041 million gallons in underground storage.

TABLE 16.—Liquefied petroleum gas storage capacity, Sept. 30, 1961, and stocks, Dec. 31, 1961

(Thousand gallons)

Refinery district, State and P.A.D. district	Storage capacity				Stocks Dec. 31, 1961
	Above ground at plants and terminals	Above ground at refineries	Underground at plants, terminals, and refineries	Total	
East Coast and Appalachian #1 [1]	4,235	17,766	87,868	----------	----------
Total P.A.D. District 1	4,235	17,766	87,868	109,869	52,707
Indiana, Illinois, Kentucky, and Applachian #2:					
Indiana	(2)	4,620	----------	----------	----------
Illinois	[2] 14,614	15,750	55,148	----------	----------
Kentucky	4,410	(3)	(4)	----------	----------
Ohio	----------	[3] 6,342	(4)	----------	----------
Michigan	412	882	98,430	----------	----------
Tennessee	----------	(3)	----------	----------	----------
Oklahoma, Kansas, Minnesota, and Wisconsin:					
Oklahoma	15,294	13,440	19,493	----------	----------
Kansas	5,272	6,384	218,726	----------	----------
Minnesota	----------	3,108	----------	----------	----------
Missouri, Nebraska, North Dakota, Iowa, and Wisconsin	7,472	(5)	----------	----------	----------
Total P.A.D. District 2	47,474	50,526	391,797	489,797	322,696
Texas Inland:					
Panhandle	25,398	(6)	166,541	----------	----------
East	6,301	(6)	----------	----------	----------
West	26,475	7,896	319,592	----------	----------
Rest of State	19,694	1,260	65,178	----------	----------
Texas Gulf	33,926	50,484	922,127	----------	----------
Louisiana Gulf and Alabama	8,309	[7] 10,500	269,527	----------	----------
Arkansas and Louisiana Inland:					
Louisiana Inland	6,386	(7)	(8)	----------	----------
Arkansas	1,992	(7)	----------	----------	----------
Mississippi	712	----------	[8] 178,460	----------	----------
New Mexico	10,081	(6)	43,875	----------	----------
Total P.A.D. District 3	139,274	70,140	1,965,300	2,174,714	1,079,087
Rocky Mountain:					
Montana and Utah	2,976	[9] 1,260	11,500	----------	----------
Wyoming	2,339	2,856	----------	----------	----------
Colorado	4,568	(9)	----------	----------	----------
Total P.A.D. District 4	9,883	4,116	11,500	25,499	13,361
West Coast	4,487	30,714	35,700	----------	----------
Total P.A.D. District 5	4,487	30,714	35,700	70,910	60,577
Total United States	205,353	173,262	2,492,165	2,870,780	[10] 1,528,408

[1] Includes Pennsylvania, West Virginia, Delaware, New Jersey, and New York.
[2] Indiana included in Illinois.
[3] Kentucky and Tennessee included in Ohio.
[4] Kentucky and Ohio included in Michigan.
[5] Missouri and North Dakota included with Kansas.
[6] Panhandle, East Texas, and New Mexico included in West Texas.
[7] Louisiana Inland, Arkansas included in Louisiana Gulf and Alabama.
[8] Louisiana Inland included in Mississippi.
[9] Colorado included in Montana and Utah.
[10] Includes 1,041 million gallons in underground storage at plants and terminals and 210 million gallons in underground storage at petroleum refineries.

STORAGE CAPACITY

The total storage capacity for liquefied gases (LP and LR gases) as of September 30, 1961, was 2,871 million gallons. This compares with 2,292 million a year ago. Additions to underground facilities accounted for 98 percent of the increase in storage capacity for the year. Storage facilities were filled to 64 percent of capacity on September 30 and to 53 percent of capacity on December 31, 1961.

PRICES

The total value of all natural gas liquids at plants in 1961 averaged 5.1 cents per gallon, compared with an average of 5.7 cents in 1960. The average price per gallon realized by producers declined 0.3 cent per gallon for natural gasoline and isopentane, 0.5 cent per gallon for LP-gases and ethane, and 1.8 cents per gallon for finished gasoline and naphtha. The average price was unchanged for other products.

The average posted price for propane at New York Harbor in 1961, according to Platt's Oil Price Handbook, was 8.39 cents per gallon, whereas the average for propane in 1960 was 8.79 cents.

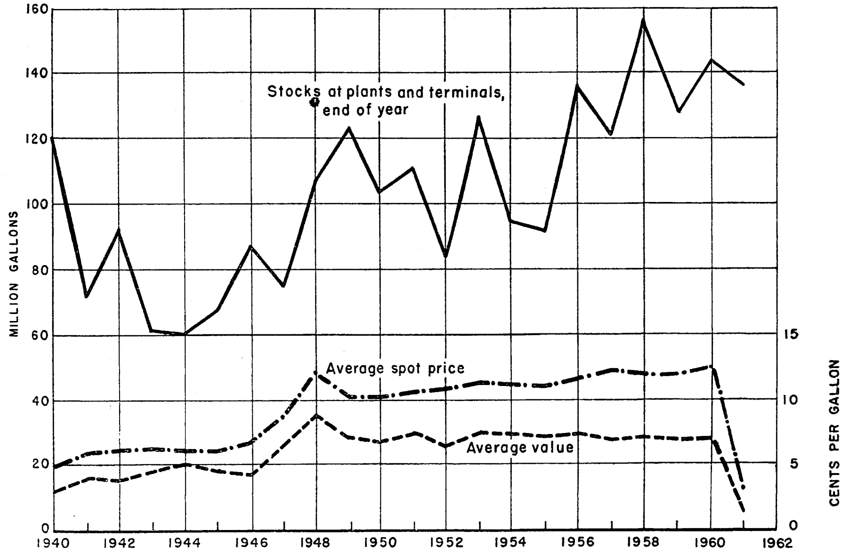

FIGURE 2.—Average gasoline, average spot price of regular 91 octane motor gasoline at Oklahoma refineries, and stocks of natural gasoline and isopentane at plants and terminals.

FOREIGN TRADE[7]

Exports of LP-gases in 1961 totaled 149 million gallons, a gain of 18.7 percent above the preceding year. Mexico continued to be the principal market for LP-gas exports from the United States. Exports of natural gasoline increased from 53,000 gallons in 1960 to 345,000 in 1961. For the past few years exports of natural gasoline had been limited to other North American countries, but in 1961 the majority of these exports went to European destinations.

Imports of liquefied gases totaled 76 million gallons in 1961, most of which originated in Canada.

TABLE 17.—LP-gases[1] exported from the United States, by countries

(Thousand gallons[2])

Country	1952–56 (average)	1957	1958[3]	1959[3]	1960[3]	1961[3]
North America:						
Canada	53,907	56,274	15,497	3,768	5,251	4,134
Cuba	5,767	10,158	4,032	3,727	1,211	---
Mexico	69,348	97,161	88,996	84,965	111,858	121,890
Netherlands Antilles	---	6,728	---	---	---	2
Other North America:						
Bermuda and Caribbean	1,534	3,332	1,280	1,118	2,580	3,364
Central America	1,111	2,809	1,063	278	456	489
Greenland	6	---	---	---	---	---
Total	131,673	176,462	110,868	93,856	121,356	129,879
South America:						
Argentina	209	107	---	72	3,818	14,514
Brazil	16,079	11,386	8,756	---	---	454
Other South America	196	368	25	95	32	34
Total	16,484	11,861	8,781	167	3,850	15,002
Europe:						
Denmark	(4)	638	---	---	---	24
France	29	41	(4)	---	(4)	149
Germany, West	69	4	(4)	132	(4)	528
Italy	30	845	---	15	21	399
Netherlands	6	10	---	2	---	133
Sweden	5	125	---	---	19	(4)
United Kingdom	29	64	11	(4)	15	1,566
Other Europe	21	31	---	3	---	46
Total	189	1,758	11	152	55	2,845
Asia:						
Israel	7	36	---	50	---	9
Japan	210	195	12	164	23	673
Philippines	292	38	---	---	---	---
Other Asia	19	15	4	---	2	22
Total	528	284	16	214	25	704
Africa	163	129	10	---	6	212
Oceania	76	109	183	140	245	410
Grand total	149,113	190,603	119,869	94,529	125,537	149,052

[1] Data include LR-gases.
[2] 4.5 pounds=1 gallon.
[3] Because of changes in classification, data not strictly comparable with earlier years.
[4] Less than 1,000 gallons.

Source: Bureau of the Census.

---

[7] Data on imports and exports compiled by Mae B. Price and Elsie D. Jackson, Bureau of Mines, from records of the United States Department of Commerce.

TABLE 18.—Natural gasoline exported from the United States, by countries

(Thousand gallons)

Country	1952-56 (average)	1957	1958	1959	1960	1961
Canada	19,896	1,821	133	67	15	61
Mexico	10	81	8	24	38	40
Netherlands Antilles	5,931					
Turkey						24
United Kingdom						140
Other countries	3,692		7			80
Total	29,529	1,902	148	91	53	345

Source: Bureau of the Census.

Crude Petroleum and Petroleum Products

By James G. Kirby,[1] Walter G. Messner,[2] and Betty M. Moore[3]

Contents

	Page
General summary	357
Demand by products	358
Scope of report	362
Districts	363
World oil supply	365
Reserves	365
Crude petroleum	366
Supply and demand	366
Production	368
General	368
By States	368
Wells	383
Consumption and distribution	386
Stocks	398
Values and price	403
Refined products	405
General review	405
Refinery capacity	415
Aviation gasoline	415
Refined products—Continued	
Gasoline	415
Kerosine	433
Distillate fuel oil	436
Residual fuel oil	441
Lubricants	446
Jet fuel (military grade)	449
Liquefied gases (including ethane)	451
Asphalt and road oil	453
Other products	461
Intercoastal shipments	465
Foreign trade	467
World supply and demand	476
Petroleum	476
Native asphalt	486
Bituminous Limestone and Sandstone	486
Gilsonite	486

GENERAL SUMMARY

For the petroleum industry, 1961 could not be considered a good year. Total demand[4] averaged 9,945,000 barrels daily, a gain of less than 1 percent over 1960, exports were 13.9 percent lower, and the increase in domestic demand was only 1.1 percent. Excessive crude runs resulted in a stock build up of 41 million barrels for the year, and the warmer than normal weather during the first and fourth quarter resulted in poor demand for heating oils. Domestic demand averaged 9,771,000 barrels daily in 1961, and exports were 174,000 barrels.

---

[1] Chief, Section of Economic Analysis and Forecast.

[2] Business analyst.

[3] Statistical assistant.

[4] Certain terms as used in this chapter are more or less peculiar to the petroleum industry. Principal terms and their meaning are listed:

Total demand.—A derived figure representing total new supply plus decreases or minus increases in reported stocks. Because there are substantial secondary and consumers' stocks that are not reported to the Bureau of Mines, this figure varies considerably from consumption.

Domestic demand.—Total demand less exports.

New supply of all oils.—The sum of crude-oil production plus production of natural-gas liquids, plus benzol (coke-oven) used for motor fuel plus imports of crude oil and other petroleum products.

Transfers.—Crude oil conveyed to fuel-oil stocks without processing, or reclassification of products from one product category to another.

All oils.—Crude petroleum, natural-gas liquids, and their derivatives.

Principal product.—Gasoline, kerosine, distillate fuel oil, and residual fuel oil.

Exports.—Total shipments from the United States, including shipments to United States Territories and possessions.

Barrels.—42 gallons per barrel.

The total new supply of all oils increased from 9,780,000 barrels daily in 1960 to 10,056,000 in 1961. Crude oil represented 71.4 percent of total new supply, 0.5 percent less than in 1960. The daily average production of crude oil in 1961 was 7,183,000 barrels compared with 7,035,000 a year ago.

Natural-gas liquids represented 9.8 percent of total new supply and imported oils, 18.8 percent.

TABLE 1.—Salient statistics of crude petroleum, refined products, and natural-gas liquids in the United States [1]

	1957	1958	1959	1960 ~~1950~~	1961 [2]
Crude petroleum:					
Domestic production ______ thousand barrels [3]	2, 616, 901	2, 448, 987	2, 574, 590	2, 574, 933	2, 621, 758
World production ______ do	6, 438, 444	6, 607, 750	7, 133, 441	7, 674, 493	8, 187, 986
United States proportion ______ percent	41	37	36	34	32
Imports [4] ______ thousand barrels [3]	373, 255	348, 007	352, 344	371, 575	381, 548
Exports [5] ______ do	50, 243	4, 346	2, 526	3, 087	3, 227
Stocks, end of year ______ do	281, 813	262, 730	257, 129	239, 800	244, 664
Runs to stills ______ do	2, 890, 436	2, 789, 404	2, 917, 661	2, 952, 534	2, 987, 158
Value of domestic production at wells:					
Total ______ thousand dollars	8, 079, 259	7, 379, 973	7, 473, 336	7, 420, 181	7, 566, 945
Average per barrel	$3. 09	$3. 01	$2. 90	$2. 88	$2. 89
Total producing oil wells, December 31	569, 273	574, 903	583, 141	591, 158	594, 917
Total oil wells completed during year (successful wells)	28, 164	25, 262	27, 055	22, 492	21, 850
Refined products:					
Imports [6] ______ thousand barrels [3]	201, 334	272, 582	297, 239	292, 536	307, 887
Exports [5] ______ do	156, 944	96, 292	74, 541	70, 819	60, 167
Stocks, end of year ______ do	537, 937	503, 314	526, 954	[7] 515, 827	543, 343
Output of gasoline ______ do	1, 438, 140	1, 439, 511	1, 488, 860	1, 522, 497	1, 531, 669
Yield of gasoline ______ percent	43. 8	45. 2	44. 9	45. 2	44. 7
Average dealers' net price (excluding tax) of gasoline in 55 United States cities cents per gallon [8]	16. 69	16. 22	16. 09	16. 08	15. 80
Completed refineries, end of year	318	313	310	311	310
Daily crude-oil capacity thousand barrels [3]	9, 408	9, 820	9, 901	[9] 10, 010	10, 087
Natural-gas liquids:					
Production ______ thousand barrels [3]	297, 990	294, 749	320, 757	340, 157	359, 083
Stocks, end of year ______ do	20, 156	22, 752	24, 887	28, 931	37, 067

[1] Data including imports and exports are for the United States.
[2] Preliminary figures.
[3] 42 gallons per barrel.
[4] Bureau of Mines data for crude oil and unfinished oils.
[5] U.S. Department of Commerce, except that Alaska (before 1959) and Hawaii (before 1960) are Bureau of Mines data. Exports include shipments to territories.
[6] U.S. Department of Commerce, except unfinished oils.
[7] New basis. See footnote 5, table 41. December 31, 1960, stocks on old basis for comparison with pervious years was 510,004,000 barrels.
[8] Platt's Oil Price Handbook.
[9] Revised.

DEMAND BY PRODUCTS

As most of the indicated consumption of crude oil in the United States is converted into products at refineries, before sale to ultimate consumers, the analysis of demand trends involves consideration of each major product. The fuel oils (residual, distillate, and kerosine) compete directly with natural gas or coal in heating, cooking, and industrial uses. Gasoline and diesel fuel are the major fuels used in transportation, followed by jet fuel (a blend of low-grade gasoline, kerosine, and distillate) used in military jet planes, and straight kerosine which is used as fuel by commercial jet planes. The other products serve a wide variety of uses in competition with other products as fuel and in special uses that are not fuels.

Gasoline.—The total demand for gasoline in 1961 was 1,541.2 million barrels, a 1.1 percent increase over 1960. Exports declined

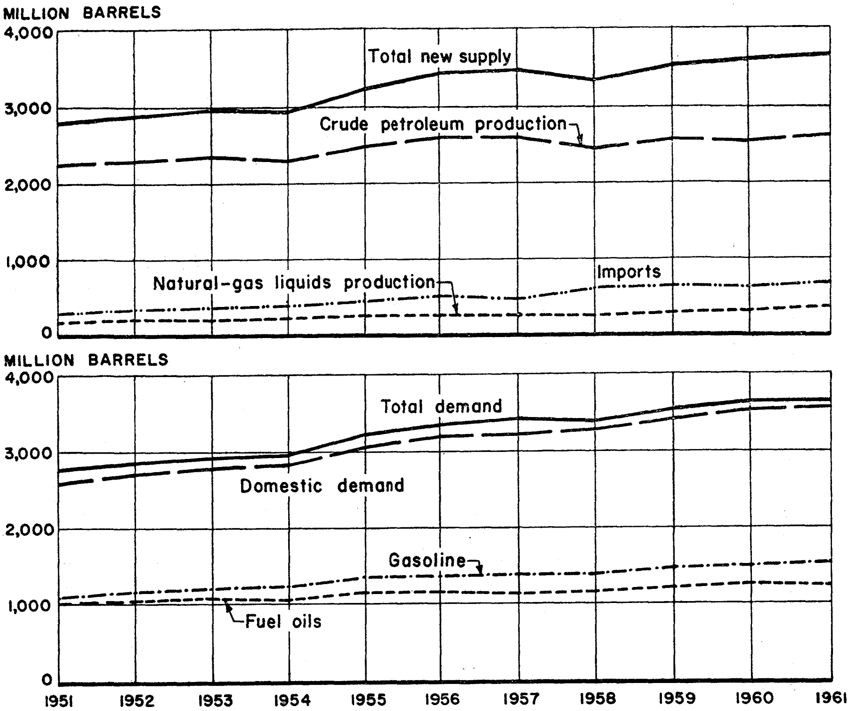

FIGURE 1.—Supply and demand of all oils in the United States, 1951–61.

to the lowest record (8.9 million barrels). Gasoline exported is mostly aviation grade, and exports of this type accounted for almost 3 million barrels of the 4.5-million-barrel decline in 1961. Domestic demand increased 1.4 percent for the year. A breakdown of domestic demand by uses indicates that civilian highways consumed 88.0 percent; aviation gasoline, 3.6 percent; and nonhighway vehicles, nonfuel use, and losses, 8.4 percent. Included in the total demand for gasoline are aviation gasoline and naphthas.

Distillate Fuel Oil.—Substantial increases in domestic demand for distillate fuel oil in the second and third quarters of 1961 offset the poor demands of the first and fourth quarters and for the year domestic demand increased 1.1 percent. The weather, based on degree-days was 1.5 percent warmer than normal during the first quarter of 1961 and 2.1 percent warmer in the fourth quarter. Exports declined 3 million barrels in 1961, and total demand for the year increased 0.7 percent to 700.1 million barrels.

Residual Fuel Oil.—Domestic demand for residual fuel oil during the entire first half of 1961 was below 1960 demand, showed a good increase in the third quarter, but in the fourth quarter remained the same as a year ago. For the year, domestic demand for residual fuel oil declined 3.4 percent and exports, 24.1 percent so that total demand was 3.8 percent less. Demand for residual fuel oil and for distillate fuel oil reacts to weather but shows a stronger reaction to the general industrial activity.

TABLE 2.—Supply and demand of all oils in the United States, 1959 total and 1960–61, by months

(Thousand barrels)

	1960													1959 total
	January	February	March	April	May	June	July	August	September	October	November	December	Total	
New supply:														
Domestic production:														
Crude petroleum	224,140	209,986	220,977	211,132	212,296	208,161	212,645	215,145	209,119	215,687	213,992	221,653	2,574,933	2,574,590
Natural-gas liquids	29,192	27,529	29,434	27,654	27,242	25,891	27,190	27,928	27,391	29,691	29,514	31,501	340,157	320,757
Benzol, etc	16	17	23	48	60	12	18	16	16	17	18	14	275	324
Total production	253,348	237,532	250,434	238,834	239,598	234,064	239,853	243,089	236,526	245,395	243,524	253,168	2,915,365	2,895,671
Imports: [1]														
Crude petroleum	28,610	29,730	29,292	33,877	30,571	32,730	31,191	32,768	32,691	31,458	29,980	28,677	371,575	352,344
Refined products	30,419	29,290	29,411	24,598	20,711	23,458	19,540	19,469	20,342	21,024	26,402	27,872	292,536	297,239
Total new supply	312,377	296,552	309,137	297,309	290,880	290,252	290,584	295,326	289,559	297,877	299,906	309,717	3,579,476	3,545,254
Increase (+) or decrease (−) in stocks	−18,105	−10,591	−34,532	+14,611	+16,307	+2,854	+14,219	+8,543	+14,347	+14,810	−4,678	−48,020	−30,235	+18,519
Demand:														
Total demand	330,482	307,143	343,669	282,698	274,573	287,398	276,365	286,783	275,212	283,067	304,584	357,737	3,609,711	3,526,735
Exports: [2]														
Crude petroleum	264	298	260	270	127	436	248	86	234	352	---------	512	3,087	2,526
Refined products	5,865	5,452	6,240	6,570	6,429	7,098	5,795	5,934	5,443	5,433	5,314	5,246	70,819	74,541
Domestic demand:														
Gasoline	111,180	108,877	119,847	128,457	129,258	138,028	135,017	137,597	127,647	126,207	124,643	124,912	1,511,670	1,485,277
Kerosine	14,702	13,965	15,956	7,631	6,214	6,663	8,068	8,434	8,846	10,474	12,776	18,770	132,499	109,919
Distillate fuel oil	86,178	73,019	86,810	45,386	40,466	39,747	34,852	37,127	39,643	45,090	61,477	95,473	685,268	659,983
Residual fuel oil	61,307	55,717	60,514	45,762	40,246	39,307	36,823	36,216	37,309	40,971	48,247	57,020	559,439	563,464
Jet fuel	8,973	8,584	8,877	7,887	8,752	9,255	8,732	8,254	8,483	8,269	8,472	8,265	102,803	104,228
Lubricants	3,287	3,350	3,651	3,600	3,901	3,700	3,792	3,690	3,484	3,480	3,470	3,271	42,676	42,878
Miscellaneous	38,726	37,881	41,514	37,135	39,180	43,164	43,038	49,445	44,123	42,791	40,185	44,268	501,450	483,919
Total domestic demand	324,353	301,393	337,169	275,858	268,017	279,864	270,322	280,763	269,535	277,282	299,270	351,979	3,535,805	3,449,668
Stocks:														
Crude petroleum	252,206	257,028	260,923	266,178	261,312	257,301	242,745	234,091	231,966	232,990	239,528	239,800	239,800	257,129
Natural-gas liquids	22,406	20,793	18,916	22,215	26,400	29,380	32,467	33,224	35,639	36,122	33,993	28,931	28,931	24,887
Refined products	516,253	502,453	465,903	471,960	488,948	492,833	518,521	534,961	549,018	562,321	553,234	510,004	510,004	526,954
Total stocks	790,865	780,274	745,742	760,353	776,660	779,514	793,733	802,276	816,623	831,433	826,755	778,735	778,735	808,970

	1961[3]													1960 total
	January	February	March	April	May	June	July	August	September	October	November	December	Total	
New supply:														
Domestic production:														
Crude petroleum	223,497	204,274	231,596	219,846	221,553	213,084	215,699	220,218	209,848	220,942	214,566	226,635	2,621,758	2,574,933
Natural-gas liquids	30,960	28,225	30,883	30,040	29,637	28,711	29,334	29,595	27,984	30,379	30,974	32,361	359,083	340,157
Benzol, etc	14	15	13	13	18	12	17	11	13	15	15	13	169	275
Total production	254,471	232,514	262,492	249,899	251,208	241,807	245,050	249,824	237,845	251,336	245,555	259,009	2,981,010	2,915,365
Imports: [1]														
Crude petroleum	33,688	28,768	33,276	26,969	33,566	27,186	37,975	34,048	33,147	33,585	30,119	29,221	381,548	371,575
Refined products	33,481	30,117	27,877	27,878	23,902	18,994	24,310	18,780	21,751	23,319	26,498	30,980	307,887	292,536
Total new supply	321,640	291,399	323,645	304,746	308,676	287,987	307,335	302,652	292,743	308,240	302,172	319,210	3,670,445	3,579,476
Increase (+) or decrease (−) in stocks.	−25,119	−7,223	+14,783	+24,135	+16,066	+9,802	+21,230	+3,339	+12,047	+12,583	−12,857	−28,270	+40,516	−30,235
Demand:														
Total demand	346,759	298,622	308,862	280,611	292,610	278,185	286,105	299,313	280,696	295,657	315,029	347,480	3,629,929	3,609,711
Exports: [2]														
Crude petroleum	135	295	339	316	229	435	178	309	130	190	400	271	3,227	3,087
Refined products	5,014	4,299	5,108	5,279	5,690	5,357	4,760	5,443	4,380	5,172	5,010	4,655	60,167	70,819
Domestic demand:														
Gasoline	114,455	105,589	126,592	119,188	137,153	138,472	137,394	140,374	130,115	128,752	128,359	125,846	1,532,289	1,511,670
Kerosine	18,134	15,111	11,653	9,020	9,179	7,804	9,213	10,136	9,521	12,056	13,809	17,758	143,394	132,499
Distillate fuel oil	96,362	74,907	66,351	53,273	44,269	37,024	39,172	40,824	41,203	47,960	64,108	87,666	693,119	685,268
Residual fuel oil	58,886	53,078	50,918	46,085	39,556	31,607	39,282	38,418	36,493	43,003	48,289	54,963	540,578	559,439
Jet fuel	7,986	7,113	8,761	8,138	10,631	8,536	7,968	9,735	10,246	8,447	8,400	8,638	104,599	102,803
Lubricants	3,599	2,801	3,536	2,998	4,049	3,574	3,481	3,745	3,496	3,794	3,470	3,096	41,639	42,676
Miscellaneous	42,188	35,429	35,604	36,314	41,854	45,376	44,657	50,329	45,112	46,283	43,184	44,587	510,917	501,450
Total domestic demand	341,610	294,028	303,415	275,016	286,691	272,393	281,167	293,561	276,186	290,295	309,619	342,554	3,566,535	3,535,805
Stocks:														
Crude petroleum	236,769	232,063	244,921	256,145	261,440	261,056	256,953	248,125	251,032	251,139	248,681	244,664	244,664	239,800
Natural-gas liquids	23,982	23,195	27,548	31,579	35,399	38,188	41,422	42,782	44,405	44,150	41,666	37,067	37,067	28,931
Refined products	498,688	496,958	494,530	503,410	510,361	517,758	539,857	550,664	558,181	570,912	562,997	543,343	543,343	[4] 515,827
Total stocks	759,439	752,216	766,999	791,134	807,200	817,002	838,232	841,571	853,618	866,201	853,344	825,074	825,074	[4] 784,558

---

[1] Bureau of Mines data for crude oil and unfinished oils, U.S. Department of Commerce data for all other imports.

[2] U.S. Department of Commerce data except for shipments to Hawaii in 1959, which are Bureau of Mines data.

[3] Preliminary figures.

[4] New basis comparable to 1961 includes pipeline stocks of jet fuel, 6,870,000 barrels; bulk terminal stocks of lubricants, 12,303,000 barrels; asphalt, 12,991,000 barrels; and miscellaneous oils, 2,846,000 barrels.

Kerosine.—The total demand for kerosine increased 7.8 percent in 1961 from 133.2 million barrels to 143.6 million. The increase in kerosine demand can be attributed entirely to increased shipments for use as commercial jet-aircraft fuel which were 14 million barrels higher than in 1960. Exports declined from 0.7 million barrels in 1960 to 0.2 million in 1961.

Other Products.—The total demand for all other products, including crude-oil exports and losses and refinery shortage and overage, was 690.4 million barrels in 1961, a gain of 1.8 percent. Excluding crude losses and the refinery overage, which was 22.8 percent higher than in 1960, the total demand for the other products in 1961 was 749.2 million barrels (3.3 percent higher than in 1960). Although exports of the principal petroleum products continued to decline in 1961, exports of crude and other products increased 5.9 percent. The percentage changes (increase or decrease) for 1961 in domestic demand for the individual products in this group are as follows: Coke, +23.3 percent; miscellaneous oils, +12.2 percent; asphalt, +3.0 percent; liquefied gases, +2.1 percent; military-jet fuel, +1.7 percent; lubricating oils, −2.4 percent; still gas, −1.5 percent; road oil, −1.3 percent; and wax, −1.1 percent. The net crude oil and refinery overage for the year was 62.1 million barrels, a 24.1 percent increase over 1960.

TABLE 3.—Demand for all oils[1] in the United States

(Million barrels)

Year	Domestic demand	Exports	Total demand	Year	Domestic demand	Exports	Total demand
1952	2,664.4	158.2	2,822.6	1957	3,218.6	207.2	3,425.8
1953	2,775.3	146.6	2,921.9	1958	3,315.2	100.6	3,415.8
1954	2,832.4	129.7	2,962.1	1959	3,449.6	77.1	3,526.7
1955	3,087.8	134.2	3,222.0	1960	3,535.8	73.9	3,609.7
1956	3,213.2	157.4	3,370.6	1961[2]	3,566.5	63.4	3,629.9

[1] See text footnote 4 at the beginning of this chapter.
[2] Preliminary figures.

Shipments to U.S. Territories and Possessions.—Domestic demand, as defined in this chapter, refers to demand in all States of the United States. Alaskan demand for petroleum is included with these States, beginning with 1959, and Hawaiian demand is included with the 1960 data. Shipments from the United States to Territories and possessions are included with exports. Any foreign receipts into these Territories and possessions are not included in the total imports shown.

Shipments from Territories and possessions to foreign countries are excluded from total exports. Shipments to the United States are included in imports.

SCOPE OF REPORT

This report deals primarily with statistics for production, refining, distribution, and indicated consumption of crude petroleum and refined products in the United States. The object of limiting data to the United States is to permit a breakdown and balancing of supply and demand of operations by States and districts. The composition of the districts used by the Bureau of Mines is explained in the next section.

The increasing volume of natural-gas liquids recovered from natural gas has made it necessary to present data on these liquids with the crude-oil data, as they are either blended with refinery products or are identical with materials recovered from refinery gases. These natural-gas liquids are recovered at special plants away from the oil refineries.

Most of the data were compiled by the Bureau of Mines from detailed reports, submitted on a voluntary basis by the various companies. These data are published monthly for release about 8 weeks after the end of the month concerned. Complete coverage, with only minor estimates, is procured for production, stocks, and refinery operations. The Bureau of Mines used the import data as reported by the refineries for crude oil and unfinished oils. Other product imports and all export data were taken from records of the U.S. Department of Commerce.

The impossibility of contacting many small producers to obtain current monthly data for crude-oil production makes it necessary to use pipeline-company reports. These companies report by States of origin, stocks on leases, oil taken from the leases, pipeline and tank-farm stocks, and crude deliveries. The data are cross-checked against reports from refineries showing crude receipts by States of origin and method of transportation. These reports include information covering final receipts by water, tank cars, and trucks and cover stocks of crude oil, held at refineries, by States of origin. The data are verified further with available current and annual production figures collected by State agencies and supplemented by estimates of unreported lease stocks. The Bureau of Mines crude-production figure includes field condensate.

Individual refineries reported monthly receipts, input, stocks at the beginning and end of the month, refinery production, and deliveries. Data on both product stocks at refineries and pipeline and bulk terminal stocks are collected.

Annual canvasses provide supplemental information on the value of crude petroleum at wells, the number of producing oil wells, sales of fuel oils, asphalt and road oils by uses, and refinery capacity.

The table showing world production of crude oil by countries is based on monthly reports that also included data on crude movements and refinery operations. Data on crude reserves, wells drilled, and current prices were taken from the sources indicated in the footnotes.

DISTRICTS

The Bureau of Mines reported production of crude petroleum and natural-gas liquids and the number of wells drilled by States. Louisiana, New Mexico, and Texas were also reported by districts.

Louisiana is divided into a Northern Louisiana district and a Louisiana Gulf Coast district. The Gulf Coast district includes Vernon, Rapides, Avoyelles, Pointe Coupee, West Feliciana, East Feliciana, Tangipahoa, St. Helena, and Washington Parishes and all parishes in the State south of these. All parishes not included in the Gulf Coast district are in the Northern Louisiana district.

New Mexico has two widely separated producing areas. The Southeastern district comprises mainly Lea, Eddy, Chaves, and Roosevelt Counties. The Northwestern district comprises mainly San Juan, Rio Arriba, Sandoval, and McKinley Counties.

The Bureau of Mines producing districts in Texas correspond, with one exception, to grouping of the Texas Railroad commission districts.

Bureau of Mines districts:	*Railroad Commission districts:*
Gulf Coast	Nos. 2 and 3
West Texas	Nos. 7C and 8
East Proper	Part of No. 6 (East Texas field in Cherokee, Smith, Upshur, Rush, and Gregg Counties)
Panhandle	No. 10
Rest of State:	
North	Nos. 7B and 9
Central	No. 1
South	No. 4
Other East Texas	Nos. 5 and 6 (exclusive of East Proper)

The Bureau of Mines groups refinery operations into another set of districts called refining districts. These refining districts correspond with the grouping originated by the Petroleum Administration for War during World War II and called PAW districts (later changed to PAD districts).

PAD district	*Refining districts*
1	*East Coast*—District of Columbia and Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, and Florida, and the following counties of New York: Cayuga, Tompkins, Chemung and all counties east and north thereof, and the following counties of Pennsylvania: Bradford, Sullivan, Columbia, Montour, Northumberland, Dauphin, York, and all counties east thereof.
1	*Appalachian No. 1*—West Virginia and those parts of Pennsylvania and New York not included in the East Coast district.
2	*Appalachian No. 2*—The following counties of Ohio: Erie, Huron, Crawford, Marion, Delaware, Franklin, Pickaway, Ross, Pike, Scioto, and all counties east thereof.
2	*Indiana-Illinois-Kentucky*—Indiana, Illinois, Kentucky, Tennessee, Michigan, and that part of Ohio not included in the Appalachian district.
2	*Oklahoma-Kansas-Missouri*—Oklahoma, Kansas, Missouri, Nebraska, and Iowa.
2	*Minnesota-Wisconsin-North Dakota-South Dakota*—Minnesota, Wisconsin, North Dakota, and South Dakota.
3	*Texas Inland*—Texas, except Texas Gulf Coast district.
3	*Texas Gulf Coast*—The following counties of Texas: Newton, Orange, Jefferson, Jasper, Tyler, Hardin, Liberty, Chambers, Polk, San Jacinto, Montgomery, Harris, Galveston, Waller, Fort Bend, Brazoria, Wharton, Matagorda, Jackson, Victoria, Calhoun, Refugio, Aransas, San Patricio, Nueces, Kleberg, Kenedy, Willacy, and Cameron.
3	*Louisiana Gulf Coast*—The following parishes of Louisiana: Vernon, Rapides, Avoyelles, Pointe Coupee, West Feliciana, East Feliciana, Tangipahoa, St. Helena, Washington, and all parishes south thereof; the following counties of Mississippi: Pearl River, Stone, George, Hancock, Harrison, and Jackson, and Mobile and Baldwin Counties, Alabama.
3	*North Louisiana-Arkansas*—Arkansas and those parts of Louisiana, Mississippi, and Alabama not included in the Louisiana Gulf Coast district.

PAD district	*Refining districts*
3	*New Mexico*—New Mexico.
4	*Rocky Mountain*—Montana, Idaho, Wyoming, Utah, and Colorado.
5	*West Coast*—Washington, Oregon, California, Nevada, Alaska, Arizona, and Hawaii.

WORLD OIL SUPPLY

The production of crude oil for the world in 1961 was 8,188 million barrels compared with 7,674 million in 1960. The U.S. total proportion of world production was 32.0 percent in 1961, 1.6 percent less than in 1960.

The world demand for petroleum was 8,346 million barrels in 1961, a gain of 7.1 percent for the year.

RESERVES

The American Petroleum Institute Committee on Petroleum Reserves estimated proved reserves of crude oil in the United States to be 31.8 billion barrels on December 31, 1961, an increase of 0.2 billion barrels for the year.

The estimates of crude-oil reserves include only oil recoverable under existing economic and operating conditions.

TABLE 4.—Estimates of proved crude-oil reserves in the United States on December 31 by States [1]

(Million barrels)

State	1954	1955	1956	1957	1958	1959	1960	1961
Eastern States:								
Illinois	658	691	700	655	608	594	556	503
Indiana	67	62	68	67	71	74	66	62
Kentucky	85	107	149	138	126	136	129	116
Michigan	60	59	55	49	45	55	78	79
New York	46	43	40	37	36	34	32	28
Ohio	37	56	64	68	71	74	75	76
Pennsylvania	102	93	135	126	120	114	108	102
West Virginia	37	47	51	53	52	51	51	51
Total	1,092	1,158	1,262	1,193	1,129	1,132	1,095	1,017
Central and Southern States:								
Arkansas	351	330	318	305	318	313	302	281
Kansas	979	998	992	947	922	917	884	878
Louisiana [2]	2,962	3,255	3,675	3,858	4,044	4,660	4,785	4,931
Mississippi	412	388	368	360	379	389	407	401
Nebraska	38	57	63	63	69	81	86	100
New Mexico	806	820	836	832	894	1,026	1,084	1,090
North Dakota	134	185	196	258	314	382	431	413
Oklahoma	1,955	2,016	2,010	1,941	1,898	1,865	1,791	1,787
Texas [2]	14,982	14,934	14,783	14,555	14,322	14,860	14,758	14,850
Total	22,619	22,983	23,241	23,119	23,160	24,493	24,528	24,731
Mountain States:								
Colorado	329	334	364	310	392	381	364	420
Montana	272	299	331	320	338	309	267	251
Utah	36	37	61	140	199	195	208	218
Wyoming	1,304	1,374	1,363	1,420	1,409	1,403	1,427	1,381
Total	1,941	2,044	2,119	2,190	2,338	2,288	2,266	2,270
Pacific Coast States: California [2]	3,889	3,801	3,771	3,760	3,866	3,763	3,659	3,615
Other States [3]	20	26	42	38	43	43	65	126
Total United States	29,561	30,012	30,435	30,300	30,536	31,719	31,613	31,759

---

[1] From reports of Committee on Petroleum Reserves, American Petroleum Institute. Includes crude oil that may be extracted by present methods from fields completely developed or sufficiently explored to permit reasonably accurate calculations. The change in reserves during any year represents total new discoveries, extensions, and revisions, minus production.

[2] Includes offshore reserves.

[3] Includes Alabama, Arizona, Florida, Missouri, Nevada, South Dakota, Tennessee, Virginia, Washington, and Alaska for 1959–61.

CRUDE PETROLEUM

SUPPLY AND DEMAND

The new supply of crude petroleum was derived primarily from domestic production, but the supply was augmented by imports. Crude imports represented 12.7 percent of the crude supply in 1961, compared with 12.6 percent in 1960. Under the mandatory import control program, which became effective March 1959, imports of crude oil and unfinished oils for further processing are limited to a percentage of the estimated total demand for all products in all States east of the Rocky Mountains. In States west of the Rocky Mountains, including Alaska and Hawaii, the quota is based on the difference between the estimated available domestic supply and the forecast of total demand. Overland receipts (imports from Canada and Mexico) are exempted from provisions of the program. Also exempted from the program are vessel and aircraft fuels imported under the bond for use as fuel outside the United States. All refineries of record are granted an allocation based on their refinery throughput; certain special provisions were applied to refineries that imported crude oil during 1957, the base year for the program.

The major part of the indicated demand for crude petroleum is converted into products before final consumption (99.6 percent in 1961), and the remainder represents exports, fuel, and losses.

TABLE 5.—Supply and demand[1] for crude petroleum in the United States

(Thousand barrels)

	1957	1958	1959	1960	1961 [2]
Production	2,616,901	2,448,987	2,574,590	2,574,933	2,621,758
Imports [3]	373,255	348,007	352,344	371,575	381,548
Total new supply	2,990,156	2,796,994	2,926,934	2,946,508	3,003,306
Increase (+) or decrease (−) in stocks, end of year	+15,799	−19,083	−5,613	−17,329	+4,864
Demand:					
Domestic crude	2,605,781	2,466,357	2,578,203	2,592,289	2,614,919
Foreign crude	368,576	349,720	354,344	371,548	383,523
Total demand	2,974,357	2,816,077	2,932,547	2,963,837	2,998,442
Runs to stills:					
Domestic	2,529,672	2,444,229	2,565,504	2,581,568	2,604,127
Foreign	360,764	345,175	352,157	370,966	383,031
Exports [4]	50,243	4,346	2,526	3,087	3,227
Transfers to fuel oil:					
Distillate	1,305	950	970	1,001	851
Residual	13,884	10,965	7,386	3,948	3,854
Other fuel losses	18,489	10,412	4,004	3,267	3,352
Total demand	2,974,357	2,816,077	2,932,547	2,963,837	2,998,442

[1] For definition see footnote at the beginning of this chapter.
[2] Preliminary figures.
[3] Bureau of Mines data.
[4] U.S. Department of Commerce.

TABLE 6.—Supply of and demand for crude petroleum in the United States, by months

(Thousand barrels)

	January	February	March	April	May	June	July	August	September	October	November	December	Total
1960:													
Supply:													
Production	224, 140	209, 986	220, 977	211, 132	212, 296	208, 161	212, 645	215, 145	209, 119	215, 687	213, 992	221, 653	2, 574, 933
Imports[1]	28, 610	29, 730	29, 292	33, 877	30, 571	32, 730	31, 191	32, 768	32, 691	31, 458	29, 980	28, 677	371, 575
Total new supply	252, 750	239, 716	250, 269	245, 009	242, 867	240, 891	243, 836	247, 913	241, 810	247, 145	243, 972	250, 330	2, 946, 508
Change in stocks, end of period:													
Domestic	−4, 802	+4, 029	+5, 220	+157	−2, 498	−4, 250	−12, 342	−8, 644	−2, 781	+2, 173	+4, 821	+1, 561	−17, 356
Foreign	−121	+793	−1, 325	+5, 098	−2, 368	+239	−2, 214	−10	+656	−1, 149	+1, 717	−1, 289	+27
Demand:													
Domestic	228, 942	205, 957	215, 757	210, 975	214, 794	212, 411	224, 987	223, 789	211, 900	213, 514	209, 171	220, 092	2, 592, 289
Foreign	28, 731	28, 937	30, 617	28, 779	32, 939	32, 491	33, 405	32, 778	32, 035	32, 607	28, 263	29, 966	371, 548
Runs to stills:													
Domestic	227, 966	204, 977	214, 869	210, 071	214, 029	211, 395	224, 140	223, 016	211, 042	212, 596	208, 466	219, 001	2, 581, 568
Foreign	28, 693	28, 903	30, 554	28, 738	32, 818	32, 378	33, 382	32, 732	31, 957	32, 561	28, 323	29, 927	370, 966
Exports[2]	264	298	260	270	127	436	248	86	234	352	---------	512	3, 087
Transfers:													
Distillate	173	81	78	78	72	70	72	79	73	69	74	82	1, 001
Residual	296	371	341	333	411	350	263	366	357	268	334	258	3, 948
Losses	281	264	272	264	276	273	287	288	272	275	237	278	3, 267
1961:[3]													
Supply:													
Production	223, 497	204, 274	231, 596	219, 846	221, 553	213, 084	215, 699	220, 218	209, 848	220, 942	214, 566	226, 635	2, 621, 758
Imports[1]	33, 688	28, 768	33, 276	26, 969	33, 566	27, 186	37, 975	34, 048	33, 147	33, 585	30, 119	29, 221	381, 548
Total new supply	257, 185	233, 042	264, 872	246, 815	255, 119	240, 270	253, 674	254, 266	242, 995	254, 527	244, 685	255, 856	3, 003, 306
Change in stocks, end of period:													
Domestic	−4, 365	−3, 201	+10, 507	+12, 775	+2, 934	+2, 813	−7, 023	−8, 201	+3, 319	−1, 026	−874	−819	+6, 839
Foreign	+1, 334	−1, 505	+2, 351	−1, 551	+2, 361	−3, 197	+2, 920	−627	−412	+1, 133	−1, 584	−3, 198	−1, 975
Demand:													
Domestic	227, 862	207, 475	221, 089	207, 071	218, 619	210, 271	222, 722	228, 419	206, 529	221, 968	215, 440	227, 454	2, 614, 919
Foreign	32, 354	30, 273	30, 925	28, 520	31, 205	30, 383	35, 055	34, 675	33, 559	32, 452	31, 703	32, 419	383, 523
Runs to stills:													
Domestic	227, 101	206, 546	219, 888	206, 139	217, 817	209, 302	221, 958	227, 483	205, 764	221, 120	214, 471	226, 538	2, 604, 127
Foreign	32, 248	30, 210	31, 076	28, 438	31, 156	30, 277	35, 016	34, 626	33, 516	32, 414	31, 671	32, 383	383, 031
Exports[2]	135	295	339	316	229	435	178	309	130	190	400	271	3, 227
Transfers:													
Distillate	81	79	77	68	66	61	66	70	71	69	69	74	851
Residual	366	344	354	363	277	309	272	314	338	343	256	318	3, 854
Losses	285	274	280	267	279	270	287	292	269	284	276	289	3, 352

[1] Bureau of Mines data.
[2] U.S. Department of Commerce.
[3] Preliminary figures.

PRODUCTION

GENERAL

Crude oil production reached an alltime record of 7,183,000 barrels daily, exceeding by 13,000 barrels daily the previous record set in 1957. Production exceeded demand in 1961 by 19,000 barrels daily resulting in an increase of 6.8 million barrels in stocks of domestic crude oil.

BY STATES

Additional data on production by States will be found in Volume III of the Minerals Yearbook.

TABLE 7.—Petroleum produced in the United States, by States [1]

(Thousand barrels unless otherwise stated)

	1957	1958	1959	1960	1961 [2]	1859–1961 total
Production:						
Alabama	5,406	5,887	5,524	7,329	6,932	43,764
Alaska	-----	-----	187	559	6,325	7,071
Arkansas	31,047	28,700	26,329	30,117	29,249	1,117,454
California	339,646	313,672	308,946	305,352	300,062	12,327,728
Colorado	54,982	48,736	46,440	47,469	46,746	641,713
Florida	461	449	424	369	371	6,901
Illinois	77,083	80,275	76,727	77,341	79,387	2,307,241
Indiana	12,662	11,864	11,554	12,054	11,152	329,775
Kansas	123,614	119,942	119,543	113,453	112,241	[3] 3,423,956
Kentucky	17,029	17,509	27,272	21,147	18,643	[4] 435,620
Louisiana	329,896	313,891	362,666	400,832	424,962	5,940,317
Michigan	10,169	9,308	10,439	15,899	18,898	[5] 460,458
Mississippi	38,922	39,512	49,620	51,673	54,492	739,591
Montana	27,172	27,957	29,857	30,240	30,907	396,436
Nebraska	19,586	20,373	22,881	23,825	24,396	163,848
Nevada	44	40	32	27	152	456
New Mexico	94,759	98,515	105,692	107,380	112,083	[6] 1,627,776
New York	2,677	1,763	1,970	1,813	1,715	[7] 197,744
North Dakota	13,259	14,259	17,824	21,992	23,568	128,322
Ohio	5,478	6,260	5,978	5,405	5,161	672,363
Oklahoma	214,661	200,699	198,090	192,913	191,834	8,418,230
Pennsylvania	8,179	6,472	6,160	6,009	5,622	1,227,002
Texas	1,073,867	940,166	971,978	927,479	938,017	24,766,742
Utah	4,367	24,811	39,959	37,594	33,118	[8] 153,008
West Virginia	2,215	2,186	2,184	2,300	2,703	468,346
Wyoming	109,584	115,572	126,050	133,910	142,589	2,061,960
Other States [9]	136	[10] 169	264	452	433	3,856
Total	2,616,901	2,448,987	2,574,590	2,574,933	2,621,758	68,067,678
Value at wells:						
Total (thousand dollars)	8,079,259	7,379,973	7,473,336	7,420,181	7,566,945	134,605,362
Average per barrel	$3.09	$3.01	$2.90	$2.88	$2.89	$1.98

[1] For detailed figures by States, 1859–1935, see Minerals Yearbook, 1937, p. 1008.

[2] Preliminary figures.

[3] Oklahoma included with Kansas in 1905 and 1906.

[4] Includes Tennessee, 1883–1907.

[5] Figures represent 1925–61 production only; earlier years included with "Other States."

[6] Figures represented 1924–61 production only; earlier years included with "Other States."

[7] Early production in New York included with Pennsylvania.

[8] Figures represent 1946–61 production only; earlier years included with "Other States."

[9] Includes Alaska, 1912–33; Arizona, 1958–61; Arkansas, 1920; Michigan, 1900–1919; Mississippi, 1933–35; Missouri, 1899–1911, 1913–16, 1919–23, and 1932–61; New Mexico, 1913, 1919–23; South Dakota, 1955–59; Tennessee, 1916–61; Utah, 1907–11, 1920, 1924–41; Virginia, 1943–61; and Washington, 1958–61.

[10] Does not include 29,000 barrels produced in Alaska.

TABLE 8.—Production of crude petroleum in the United States, by States and months [1]

(Thousand barrels)

State	January	February	March	April	May	June	July	August	September	October	November	December	Total
1960:													
Alabama	492	512	537	583	679	649	658	657	636	665	626	635	7, 329
Alaska	18	20	23	1	10	23	24	27	37	89	127	160	559
Arkansas	2, 631	2, 502	2, 506	2, 440	2, 604	2, 482	2, 570	2, 552	2, 386	2, 531	2, 450	2, 463	30, 117
California [2]	25, 784	24, 229	26, 014	25, 148	25, 958	25, 198	25, 845	25, 693	24, 865	25, 814	25, 029	25, 775	305, 352
Colorado [3]	3, 990	3, 727	3, 997	3, 844	3, 998	3, 845	4, 000	4, 009	3, 926	4, 069	3, 953	4, 111	47, 469
Florida	35	35	36	30	31	28	31	30	27	28	27	31	369
Illinois	6, 750	6, 045	6, 380	6, 333	6, 510	6, 464	6, 491	6, 642	6, 422	6, 591	6, 413	6, 300	77, 341
Indiana	1, 047	977	988	995	1, 010	950	999	1, 114	981	990	990	1, 013	12, 054
Kansas [4]	9, 733	8, 942	9, 255	9, 395	9, 548	9, 086	9, 410	9, 786	9, 451	9, 610	9, 569	9, 668	113, 453
Kentucky	1, 916	1, 779	1, 770	1, 891	1, 936	1, 789	1, 770	1, 780	1, 681	1, 703	1, 586	1, 546	21, 147
Louisiana [5]	33, 720	31, 764	33, 954	32, 764	33, 033	32, 180	33, 492	33, 801	32, 427	34, 250	33, 930	35, 517	400, 832
Michigan [6]	1, 026	1, 021	1, 177	1, 171	1, 326	1, 257	1, 300	1, 456	1, 441	1, 504	1, 565	1, 655	15, 899
Mississippi	4, 546	4, 418	4, 238	4, 099	4, 184	4, 102	4, 250	4, 323	4, 214	4, 351	4, 401	4, 547	51, 673
Montana [7]	2, 556	2, 466	2, 543	2, 443	2, 410	2, 425	2, 604	2, 617	2, 519	2, 599	2, 509	2, 549	30, 240
Nebraska	1, 938	1, 773	1, 876	1, 813	1, 969	1, 999	2, 146	2, 191	2, 019	2, 131	1, 955	2, 015	23, 825
New Mexico [8]	9, 267	8, 807	9, 153	8, 631	8, 961	8, 652	9, 053	9, 167	8, 896	9, 142	9, 081	8, 570	107, 380
New York	151	146	159	156	160	158	148	152	151	148	148	136	1, 813
North Dakota [9]	1, 789	1, 672	1, 537	1, 638	1, 765	1, 824	1, 913	2, 073	1, 833	1, 908	1, 906	2, 134	21, 992
Ohio	470	437	462	451	448	457	437	483	454	446	448	412	5, 405
Oklahoma	17, 396	16, 212	16, 746	15, 975	16, 286	15, 417	15, 703	15, 892	15, 077	16, 065	15, 852	16, 292	192, 913
Pennsylvania	489	474	491	514	523	533	474	542	518	506	500	445	6, 009
Texas	83, 904	78, 613	83, 145	77, 638	74, 859	74, 313	74, 425	75, 039	74, 275	75, 512	75, 630	80, 126	927, 479
Utah [10]	3, 420	3, 168	3, 385	3, 178	3, 144	3, 160	2, 945	2, 934	2, 889	2, 568	3, 354	3, 449	37, 594
West Virginia	166	160	193	198	192	205	183	206	209	202	205	181	2, 300
Wyoming	10, 887	10, 060	10, 369	9, 760	10, 700	10, 938	11, 728	11, 934	11, 740	12, 219	11, 694	11, 881	133, 910
Other States	19	27	43	43	52	27	46	45	45	46	44	42	[11] 479
Total: 1960	224, 140	209, 986	220, 977	211, 132	212, 296	208, 161	212, 645	215, 145	209, 119	215, 687	213, 992	221, 653	2, 574, 933
1959	223, 926	201, 435	222, 839	217, 685	223, 806	212, 489	210, 311	209, 733	205, 700	214, 248	209, 449	222, 969	2, 574, 590
Daily average, 1960	7, 230	7, 241	7, 128	7, 038	6, 848	6, 939	6, 860	6, 940	6, 971	6, 958	7, 133	7, 150	7, 035
Pennsylvania Grade (included above)	945	914	984	1, 012	1, 011	1, 045	950	1, 056	1, 032	1, 014	1, 004	906	11, 873

See footnotes at end of table.

TABLE 8.—Production of crude petroleum in the United States, by States and months [1]—Continued

(Thousand barrels)

State	January	February	March	April	May	June	July	August	September	October	November	December	Total
1961: [12]													
Alabama	619	562	625	621	643	504	442	565	549	583	586	633	6,932
Alaska	192	243	320	379	454	532	579	664	655	715	795	797	6,325
Arkansas	2,539	2,428	2,634	2,500	2,439	2,329	2,394	2,405	2,335	2,398	2,407	2,441	29,249
California [2]	25,579	23,217	25,769	24,853	25,607	24,621	25,323	25,278	24,555	25,444	24,532	25,284	300,062
Colorado [3]	4,075	3,689	4,106	3,919	3,988	3,690	3,952	3,857	3,899	3,959	3,785	3,827	46,746
Florida	33	31	32	30	30	29	26	35	31	29	25	40	371
Illinois	6,564	6,127	6,701	6,436	6,627	6,639	6,646	6,931	6,503	6,944	6,627	6,642	79,387
Indiana	956	862	1,034	872	985	871	916	956	887	953	929	931	11,152
Kansas [4]	9,620	8,887	9,697	9,276	9,538	9,237	9,287	9,626	9,137	9,551	9,232	9,153	112,241
Kentucky	1,540	1,460	1,699	1,500	1,594	1,552	1,590	1,631	1,515	1,576	1,490	1,496	18,643
Louisiana [5]	35,677	31,933	35,395	35,287	36,490	35,525	35,383	35,513	33,459	36,689	35,899	37,712	424,962
Michigan [6]	1,667	1,523	1,667	1,597	1,663	1,635	1,541	1,556	1,497	1,557	1,485	1,510	18,898
Mississippi	4,610	4,144	4,645	4,496	4,644	4,325	4,614	4,633	4,481	4,631	4,576	4,693	54,492
Montana [7]	2,585	2,330	2,525	2,465	2,596	2,482	2,545	2,753	2,640	2,694	2,628	2,664	30,907
Nebraska	1,998	2,069	2,189	2,133	2,043	2,020	1,899	1,923	1,888	2,220	1,872	2,142	24,396
New Mexico [8]	9,208	8,590	9,576	9,495	9,700	9,281	9,358	9,637	9,238	9,580	9,193	9,227	112,083
New York	135	126	147	166	150	144	137	145	133	143	135	154	1,715
North Dakota [9]	1,989	1,900	1,964	1,751	1,433	1,788	2,067	2,133	2,078	2,101	2,114	2,250	23,568
Ohio	407	377	433	388	443	430	442	483	437	459	443	419	5,161
Oklahoma	16,731	15,253	16,985	16,385	16,389	15,173	15,459	15,999	15,412	16,054	15,246	16,748	191,834
Pennsylvania	465	430	508	429	518	491	469	503	456	475	454	424	5,622
Texas	80,378	73,493	87,011	80,416	78,041	75,317	76,502	78,133	73,799	77,510	75,646	81,771	938,017
Utah [10]	3,392	2,758	2,860	2,593	2,622	2,815	2,514	2,545	2,670	2,839	2,753	2,757	33,118
West Virginia	192	189	212	197	227	226	220	239	232	262	268	239	2,703
Wyoming	12,304	11,607	12,806	11,612	12,638	11,379	11,343	12,024	11,315	11,526	11,398	12,637	142,589
Other States	42	46	56	50	51	49	51	51	47	50	48	44	[13] 585
Total: 1961	223,497	204,274	231,596	219,846	221,553	213,084	215,699	220,218	209,848	220,942	214,566	226,635	2,621,758
1960	224,140	209,986	220,977	211,132	212,296	208,161	212,645	215,145	209,119	215,687	213,992	221,653	2,574,933
Daily average, 1961	7,210	7,296	7,471	7,328	7,147	7,103	6,958	7,104	6,995	7,127	7,152	7,311	7,183
Pennsylvania Grade (included above)	927	877	1,021	933	1,061	1,026	997	1,082	1,002	1,061	1,038	987	12,012

[1] Includes field condensate.
[2] Conservation Committee of California Oil Producers.
[3] Colorado Oil and Gas Conservation Commission.
[4] Kansas Geological Survey.
[5] Louisiana Conservation Commission.
[6] Michigan Department of Conservation.
[7] Montana Oil Conservation Board.
[8] Source: 1960 Bureau of Mines; 1961—New Mexico Oil and Gas Conservation Commission.
[9] North Dakota Geological Survey.
[10] Utah Oil and Gas Conservation Commission.
[11] Includes Arizona (73), Missouri (75), Nevada (27), South Dakota (281), Tennessee (20), Virginia (2), and Washington (1).
[12] Preliminary figures.
[13] Arizona (67), Missouri (108), Nevada (152), South Dakota (234), Tennessee (181), and Virginia (6).

TABLE 9.—Percentage of total crude petroleum produced in the United States, by States

	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961 [1]
Texas	44.6	43.2	42.1	42.4	42.3	41.0	38.4	37.8	36.0	35.8
Louisiana	10.7	10.9	10.6	10.9	11.4	12.6	12.8	14.1	15.6	16.2
California	15.7	15.5	15.4	14.3	13.4	13.0	12.8	12.0	11.8	11.5
Oklahoma	8.3	8.6	8.0	8.2	8.2	8.2	8.2	7.7	7.5	7.3
Wyoming	3.0	3.5	4.0	4.0	4.0	4.2	4.7	4.9	5.2	5.4
Kansas	5.0	4.9	5.2	4.9	4.7	4.7	4.9	4.6	4.4	4.3
New Mexico	2.6	3.0	3.2	3.3	3.4	3.6	4.0	4.1	4.2	4.3
Illinois	2.6	2.5	2.9	3.3	3.1	2.9	3.3	3.0	3.0	3.0
Mississippi	1.6	1.5	1.5	1.5	1.6	1.5	1.6	1.9	2.0	2.1
Colorado	1.3	1.5	2.0	2.1	2.2	2.1	2.0	1.8	1.9	1.8
Montana	.4	.5	.6	.6	.8	1.0	1.1	1.2	1.2	1.2
Arkansas	1.3	1.3	1.3	1.1	1.1	1.2	1.2	1.0	1.2	1.1
Kentucky	.5	.5	.6	.6	.7	.7	.7	1.1	.8	.7
Michigan	.6	.5	.5	.5	.4	.4	.4	.4	.6	.7
Other States	1.8	2.1	2.1	2.3	2.7	2.9	3.9	4.4	4.6	4.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[1] Preliminary figures.

TABLE 10.—Production of crude petroleum in leading fields in the United States, and total production since discovery [1]

(Thousand barrels)

Field [2]	State	1960	1961	Total since discovery [3]
East Texas	Texas	43,124	44,064	3,502,084
Wilmington	California	27,570	27,948	911,873
Sho-Vel-Tum	Oklahoma	24,227	24,510	573,315
Elk Basin	Montana, Wyoming	20,665	23,306	206,941
Coalinga, all fields	California	20,439	20,713	863,487
Seeligson (all zones)	Texas	10,918	19,342	214,529
Goldsmith	do	9,432	17,959	300,987
Caillou Island	Louisiana	16,694	17,634	177,356
Ward-Estes	Texas	15,032	17,095	131,657
Kelly-Snyder	do	14,929	16,894	273,330
Bay Marchand, Block 2	Louisiana	9,858	16,723	58,879
Rangely	Colorado	17,135	16,566	316,566
Ventura	California	17,121	16,233	656,143
Huntington Beach	do	16,620	15,940	683,439
South Pass, Block 24	Louisiana	16,528	15,671	158,289
Burbank	Oklahoma	15,676	15,275	393,865
Midway Sunset	California	13,982	14,565	897,877
Cowden, all fields	Texas	13,820	14,102	344,424
Loudon	Illinois	12,628	13,356	261,425
Timbalier Bay	Louisiana	11,695	11,860	68,427
San Ardo	California	11,534	11,743	113,939
Wasson	Texas	11,711	11,212	365,842
Cuyama, South	California	12,235	11,154	150,463
Spraberry Trend	Texas	11,502	10,801	151,738
Lake Washington	Louisiana	10,863	10,618	73,820
Kern Front and Kern River	California	9,064	10,615	464,723
Golden Trend	Oklahoma	11,071	10,202	217,830
Salem	Illinois	8,482	9,659	289,735
Weeks Island	Louisiana	8,422	9,538	108,597
South Pass, Block 27	do	7,274	8,980	30,082
Hamilton Dome	Wyoming	7,482	8,963	79,441
Hawkins	Texas	9,173	8,897	269,771
Buena Vista	California	9,762	8,840	498,799
West Delta, Block 30	Louisiana	7,444	8,809	31,285
Slaughter	Texas	8,553	8,615	277,605
McElroy	do	8,928	8,407	194,817
Hastings	do	7,786	7,744	319,160
Adena & South Adena	Colorado	7,567	7,744	48,601
Keystone	Texas	5,368	7,456	177,371
Bridgeport (Old)	Illinois	7,174	7,330	291,780
Main Pass, Block 69	Louisiana	7,305	7,227	52,684
Eunice-Monument	New Mexico	7,632	7,039	283,107
Howard Glasscock	Texas	6,312	6,857	219,417
Erath	Louisiana	3,590	6,745	92,897
Clay City	Illinois	7,470	6,683	225,997
Cotton Valley	Louisiana	1,850	6,678	104,549
Lake Barre	do	5,231	6,438	44,954

See footnotes at end of table.

TABLE 10.—Production of crude petroleum in leading fields in the United States, and total production since discovery [1]—Continued

Field [2]	State	1960	1961	Total since discovery [3]
Tom O'Connor	Texas	6,532	6,432	258,655
Little Creek	Mississippi	5,669	6,431	18,985
Brea-Olinda	California	5,950	6,330	282,420
Swanson River-Soldatna	Alaska	[3] 559	6,300	7,080
TXL	Texas	9,243	6,280	164,076
Beaver Lodge-Tioga	North Dakota	3,378	6,247	59,305
Salt Creek	Wyoming	4,876	6,217	390,605
Fullerton (& North & South)	Texas	6,060	6,187	148,978
Scipio	Michigan	3,514	6,090	12,296
Bradford Allegheny [4]	Pennsylvania-New York	6,287	5,979	701,223
Baxterville	Mississippi	5,901	5,949	83,822
West Bay	Louisiana	5,282	5,945	56,388
Gladiola	New Mexico	6,031	5,901	28,118
Caprock & East	do	5,525	5,881	50,296
Oregon Basin & West	Wyoming	5,187	5,875	103,583
Denton (all zones)	New Mexico	6,293	5,841	81,965
South Mountain	California	6,682	5,834	92,919
Block 31	Texas	5,821	5,800	65,877
Levelland	do	5,879	5,787	124,749
Citronnelle	Alabama	6,464	5,769	27,031
Inglewood	California	4,541	5,760	227,015
Emma (& Triple N)	Texas	5,750	5,743	46,898
Diamond M	do	6,451	5,711	103,694
Ratherford	Utah	7,334	5,700	24,143
Caddo	Louisiana	6,118	5,638	263,245
Webster	Texas	5,802	5,629	257,194
Bay St. Elaine	Louisiana	4,720	5,596	47,816
Grand Isle, Block 16	do	3,819	5,516	14,688
Magnolia	Arkansas	4,652	5,493	109,535
Headlee	Texas	5,003	5,490	30,713
Bayou Sale	Louisiana	3,613	5,387	73,710
Conroe	Texas	5,162	5,375	394,235
High Island	do	4,906	5,334	67,758
Coles Levee, North & South	California	5,673	5,326	133,995
Thompson, all fields	Texas	5,188	5,298	243,808
Kermit	do	6,143	5,290	76,295
Long Beach	California	5,609	5,251	828,771
Pine Unit Area	Montana	5,171	5,248	31,354
New Harmony	Illinois	5,252	5,246	110,352
Garland & South	Wyoming	5,256	5,111	64,600
Delhi	Louisiana	5,422	5,097	115,647
Midland Farms	Texas	4,685	5,045	68,746

---

[1] The data shown on this table was extracted from the Oil & Gas Journal and may not agree with the field breakdowns shown in other tables which were reported to the Bureau of Mines by the companies.
[2] Fields under 5 million barrels not shown for current year.
[3] Includes revisions.
[4] Bureau of Mines data.

TABLE 11.—Production of crude petroleum in Arkansas, by fields

(Thousand barrels)

Field [1]	1957	1958	1959	1960	1961 [2]
Atlanta	399	228	148	290	----
Buckner	415	363	332	309	----
Dorcheat-Macedonia	721	303	314	617	603
El Dorado	990	826	646	456	597
Fouke	1,468	1,279	855	1,088	1,074
Horsehead	188	----	----	----	----
Magnolia	4,521	4,058	4,439	5,032	5,493
McKamie	1,337	976	755	950	1,387
Midway	2,299	2,046	2,196	2,211	2,208
Schuler	2,119	1,791	1,849	1,510	1,725
Smackover	4,206	4,114	4,363	4,057	3,267
Stephens	1,745	1,681	1,472	1,182	1,108
Village	776	721	398	626	529
Wesson	2,491	2,239	1,525	1,717	1,539
Other fields	7,372	8,075	7,037	10,072	9,719
Total Arkansas [3]	31,047	28,700	26,329	30,117	29,249

---

[1] Breakdown for individual fields from the Oil and Gas Journal.
[2] Preliminary figures.
[3] Source: 1957–60 Bureau of Mines; 1961—Arkansas Oil and Gas Commission.

TABLE 12.—Production of crude petroleum in California, by districts and fields

(Thousand barrels)

District and field	1957	1958	1959	1960	1961[1]
San Joaquin Valley:					
Belridge	4,677	4,782	4,620	5,035	5,178
Buena Vista	7,457	6,901	9,815	9,728	8,837
Coalinga	27,746	26,740	21,225	20,621	22,926
Coles Levee	5,888	5,443	4,824	5,659	5,320
Cuyama-Russell Ranch	16,215	15,084	14,544	14,233	12,988
Edison	4,135	3,808	3,527	3,033	2,707
Elk Hill	5,662	5,361	5,126	4,368	4,026
Fresno Group	---	---	3,033	3,067	3,163
Fruitvale	2,994	2,721	2,500	2,426	2,493
Greeley	3,502	2,981	2,665	2,460	2,305
Helm	981	829	883	1,272	1,337
Kern River-Kern Front	7,665	6,888	8,648	9,460	10,819
Kettleman North Dome	4,898	4,786	3,926	3,478	2,992
Lost Hills	1,706	1,324	1,272	1,499	1,786
McKittrick	7,807	7,018	6,512	7,287	7,589
Midway-Sunset	15,206	13,107	13,126	13,959	14,557
Mountain View	1,608	1,523	1,403	1,587	1,356
Mount Poso	3,319	3,392	3,173	2,854	2,474
Poso Creek	1,655	1,342	1,349	1,354	1,475
Raisin City	1,951	1,793	1,668	1,457	1,277
Rio Bravo	4,262	3,629	3,464	3,260	2,746
Riverdale	540	487	391	328	319
Round Mountain	1,590	1,497	1,467	1,408	1,296
Tejon Group	2,331	2,722	5,030	5,105	4,214
Ten Section	1,577	1,506	1,614	1,469	1,279
Vallecitos Group	---	---	857	562	396
Wheeler Ridge	---	---	1,849	2,186	2,422
Other San Joaquin Valley	10,421	6,587	9,851	9,660	7,733
Total San Joaquin Valley	145,793	132,251	138,362	138,815	136,010
Coastal district:					
Aliso Canyon	2,343	2,027	1,876	1,723	1,578
Cat Canyon	4,481	4,197	4,454	3,361	3,843
Del Valle	1,140	961	423	818	351
Elwood	1,050	931	721	618	448
Gato Ridge	890	756	685	691	645
Lompoc	886	153	371	883	813
Newall-Potrero	3,199	2,871	2,656	2,239	2,074
Orcutt	1,099	1,046	976	925	899
Padre Canyon	---	---	---	258	998
Placerita	1,458	1,333	1,126	983	846
Rincon	3,204	3,527	3,903	3,991	3,989
San Ardo	11,845	10,864	10,994	11,519	11,744
San Miguelita	2,346	2,102	1,341	1,166	1,064
Santa Maria	2,544	2,198	1,968	1,939	1,667
South Mountain	6,561	6,980	7,384	6,709	5,826
Ventura	21,159	20,451	18,872	17,065	16,192
Zaca Creek	780	668	633	585	515
Other Coastal	20,188	20,021	19,766	18,944	17,861
Total Coastal	85,173	81,086	78,149	74,417	71,353
Los Angeles Basin:					
Brea Olinda	6,850	6,362	5,904	5,884	6,327
Coyote	4,471	3,942	2,333	4,302	4,166
Dominguez	3,992	3,710	3,417	3,572	2,974
Huntington Beach	21,452	19,447	18,110	16,761	15,889
Inglewood	4,642	4,419	4,280	4,545	5,771
Long Beach	6,761	6,167	5,841	5,615	5,253
Montebelle	1,450	1,360	1,331	1,265	1,268
Newport	1,507	1,467	2,230	1,248	1,169
Richfield	2,112	2,133	2,073	1,985	1,825
Rosecrans	1,119	971	996	988	943
Sansinena	3,646	2,604	2,219	2,430	2,065
Santa Fe Springs	4,444	3,890	3,334	2,887	2,703
Seal Beach	4,037	3,881	3,401	3,249	3,051
Torrance	2,715	3,084	2,615	2,260	2,112
Wilmington	32,306	31,417	26,993	27,495	27,978
Other Los Angeles Basin	7,176	5,481	7,358	7,634	9,205
Total Los Angeles Basin	108,680	100,335	92,435	92,120	92,699
Total California[2]	339,646	313,672	308,946	305,352	300,062

[1] Preliminary figures.
[2] Source: Conservation Committee of California Oil Producers.

TABLE 13.—Production of crude petroleum in Colorado, by fields

(Thousand barrels)

Field [1]	1957	1958	1959	1960	1961 [2]
Adena	5,518	4,965	6,463	7,567	7,744
Badger Creek-West	498	383	--------	570	630
Big Beaver	896	1,062	1,014	990	840
Black Hollow	656	549	538	470	468
Bobcat	625	670	535	389	429
Cliff	565	553	557	484	425
Graylin-South and Northwest	690	631	524	432	471
Little Beaver Creek	--------	--------	--------	1,601	977
Little Beaver-East	2,282	1,754	1,666	914	1,152
Mt. Hope-East and North	566	430	689	--------	--------
Plum Bush Creek	1,062	1,138	790	1,021	2,931
Rangely	26,154	20,914	17,980	17,135	16,566
Wilson Creek	2,528	2,396	2,709	2,800	2,509
Yenter	621	658	509	394	--------
Other	12,321	12,633	12,466	12,702	11,604
Total Colorado [3]	54,982	48,736	46,440	47,469	46,746

[1] Breakdown for individual fields from the Oil and Gas Journal.
[2] Preliminary figures.
[3] Source: Colorado Oil and Gas Conservation Commission.

TABLE 14.—Production of crude petroleum in Illinois by fields

(Thousand barrels)

Field [1]	1957	1958	1959	1960	1961 [2]
Albion	1,313	1,377	1,113	888	863
Benton	807	606	529	467	442
Boyd	952	668	485	382	--------
Bridgeport	4,174	5,280	6,264	7,174	7,330
Centralia	2,076	3,480	2,160	1,420	995
Clay City	8,187	7,972	7,269	7,470	6,683
Dale	2,441	2,485	1,979	2,506	3,136
East Inman	1,415	1,537	1,126	746	495
Johnsonville	1,010	992	1,698	1,438	1,433
Loudon	11,691	13,158	12,586	12,628	13,356
New Harmony	3,462	4,430	4,758	5,252	5,246
Phillipstown	547	691	606	653	622
Robinson	2,752	2,755	3,197	3,624	4,033
Roland	2,449	2,155	1,860	1,545	1,304
Sailor Springs	1,552	1,531	1,378	1,382	1,281
Salem	5,644	6,475	6,926	8,482	9,659
Other fields	26,611	24,683	22,793	21,284	22,509
Total Illinois [3]	77,083	80,275	76,727	77,341	79,387

[1] Breakdown for individual fields from the Oil and Gas Journal.
[2] Preliminary figures.
[3] Source: Bureau of Mines.

TABLE 15.—Pipeline runs of crude petroleum in Kansas by fields

(Thousand barrels)

Field	1957	1958	1959	1960	1961 [1]
Bemis-Shutts	5,922	5,063	4,868	4,472	4,116
Bloomer	954	789	723	679	652
Browning	1,126	1,031	768	400	226
Burrton	455	624	602	639	579
Cahoj	--------	--------	50	453	627
Chase-Silica	4,271	3,260	3,689	3,219	2,919
Cooper	1,416	1,317	1,109	951	897
El Dorado	4,619	4,371	4,443	4,291	4,239
Elrick	23	235	462	474	512
Eubank	--------	58	220	506	795
Fairport	1,061	1,065	1,040	991	903
Garfield	1,742	1,092	649	464	383
Gates	800	843	776	689	668

See footnotes at end of table.

TABLE 15.—Pipeline runs of crude petroleum in Kansas by fields—Continued

Field	1957	1958	1959	1960	1961[1]
Genesco-Edwards	2,236	1,812	1,680	1,565	1,529
Gladys	1,859	1,638	1,202	763	690
Gorham	1,501	1,499	1,421	1,311	1,238
Hall-Gurney	3,543	3,296	3,253	3,229	3,291
Humboldt-Chanute	859	838	846	742	746
Interstate	264	644	1,152	993	979
Irvin	501	618	600	547	517
Iuka-Carmi	1,219	1,035	855	702	618
Kraft-Prusa	3,437	3,092	2,890	2,526	2,317
Lost Springs	550	495	1,704	1,914	2,350
Marcotte	2,020	1,779	1,596	1,424	1,258
Morel	1,617	1,477	1,354	1,299	1,239
Nichols	783	648	780	795	675
Norton	786	660	590	544	507
Ogallah	667	692	655	591	614
Paola-Rantoul	872	758	702	644	612
Pleasant Prairie	92	254	1,369	1,839	1,719
Ray	1,314	1,353	1,363	1,289	1,306
Rhodes	1,074	664	403	305	220
Ritz-Canton	1,563	1,542	1,321	1,199	1,120
Rock	285	415	528	544	547
Seeley-Wick	978	719	583	1,097	970
Spivey-Grabs-Basil	2,031	1,961	2,370	2,492	3,726
Stoltenberg	889	792	718	648	638
Trapp	3,728	3,366	3,120	2,752	2,542
Trico	1,239	1,253	1,117	991	1,146
Unger	1,126	1,189	1,008	772	638
Welch-Bornholdt	1,240	1,216	932	878	784
Wellington	372	508	591	528	651
Wil	6	173	572	669	619
Other fields	-----	-----	-----	59,524	58,919
Total Kansas	61,040	56,134	56,674	113,344	112,241
Change in field stocks[2]	-----	-----	-----	+109	-----
Total Kansas production[2]	61,040	56,134	57,674	113,453	112,241

[1] Preliminary figure.
[2] Bureau of Mines.

Source: Kansas Geological Survey.

TABLE 16.—Production of crude petroleum in Louisiana by districts and fields

(Thousand barrels)

District and field[1]	1957	1958	1959	1960	1961[2]
Gulf Coast:					
Anse la Butte	2,065	1,656	1,775	1,687	1,565
Avery Island	3,240	2,580	2,712	3,089	2,985
Bateman Lake	2,120	2,191	2,836	2,694	3,538
Barataria	1,023	800	761	864	478
Bay de Chene	1,794	1,600	1,913	2,199	2,272
Bay Marchand	3,791	4,684	6,390	10,264	16,723
Bay St. Elaine	3,376	3,338	3,764	4,355	5,596
Bayou Blue	1,133	913	743	772	767
Bayou Choctaw	1,204	1,131	1,361	1,434	1,347
Bayou Mallet	823	829	981	812	800
Bayou Sale	2,712	2,297	3,138	3,948	5,387
Bully Camp	1,582	1,236	1,452	1,321	1,529
Caillou Island	11,298	11,260	14,751	17,040	17,634
Charenton	1,391	1,228	1,573	1,407	1,445
Cox Bay	2,303	1,565	1,348	1,391	1,932
Delta Farms	4,010	3,285	3,656	3,391	2,885
Dog Lake	887	755	770	738	711
Duck Lake	2,477	2,282	2,483	2,709	2,765
East White Lake	1,463	1,111	1,044	1,672	782
Egan	2,263	1,839	1,773	1,785	1,474
Erath	1,310	1,365	1,201	1,208	6,745
Garden Island	1,429	1,373	1,672	2,116	2,865
Gibson	910	809	853	913	968
Golden Meadow	3,032	2,649	2,500	2,355	2,363
Good Hope	1,058	859	855	983	937
Grand Bay	4,113	3,178	3,084	4,067	3,568

See footnotes at end of table.

TABLE 16.—Production of crude petroleum in Louisiana by districts and fields—Continued

District and field [1]	1957	1958	1959	1960	1961 [2]
Grand Isle	------------	1,722	2,410	3,819	5,516
Gueydan	961	800	923	1,119	1,003
Hackberry	6,903	5,914	5,706	5,251	4,413
Horseshoe Bayou	807	722	760	739	673
Iberia	814	785	841	886	672
Iowa	2,006	1,743	1,553	1,383	1,319
Jeanerette	1,271	1,147	1,219	1,170	1,074
Jennings	1,247	1,301	1,439	1,518	1,310
Lafitte	3,058	2,670	3,176	3,419	3,563
Lake Arthur	1,024	1,077	1,531	1,510	1,700
Lake Barre	2,066	2,577	4,336	5,340	6,438
Lake Chicot	954	721	783	730	732
Lake Fausse Point	1,750	1,499	1,651	1,577	1,407
Lake Pelto	2,951	3,102	4,086	4,571	4,551
Lake Salvador	1,641	1,635	2,067	2,310	2,238
Lake Washington	11,089	9,682	11,098	11,329	10,618
La Rose	1,009	1,021	1,133	975	925
Leeville	4,033	3,711	3,829	3,826	3,794
Little Lake	2,453	2,096	2,509	2,274	1,940
Lockport	920	768	795	780	692
Main Pass	11,064	9,672	9,581	11,110	11,194
North Crowley	1,107	924	1,008	838	1,170
Paradis	2,625	2,286	2,479	2,732	2,701
Phoenix Lake	1,228	1,042	1,231	1,520	943
Pine Prairie	826	692	577	482	525
Point-a-la-Hache	1,884	915	1,397	1,360	1,311
Port Barre	763	680	781	877	834
Quarantine Bay	3,536	2,765	2,953	3,227	4,678
Romere Pass	3,488	2,638	2,807	2,736	3,086
St. Gabriel	731	597	529	585	603
Section 28	1,336	1,101	1,093	1,014	1,242
Shuteston	905	979	902	701	445
South Pass Block 24	9,301	10,359	7,168	11,120	15,671
South Pass Block 27	2,166	3,579	5,620	7,274	8,980
Tepetate	1,580	1,418	1,442	1,499	1,169
Timbalier Bay	8,600	8,562	10,202	11,996	11,860
University	822	508	446	435	518
Valentine	1,688	2,302	2,981	3,502	1,726
Venice	5,514	4,317	4,411	4,567	4,599
Ville Platte	996	794	805	810	859
Vinton	2,061	1,756	1,777	1,856	1,622
Weeks Island	8,602	6,871	7,318	8,397	9,538
West Bay	4,016	3,705	4,275	5,182	5,945
West Cote Blanche	2,022	2,989	2,967	4,375	4,559
West Delta, Block 30	------------	------------	5,960	6,799	8,809
West Lake Verret	1,333	1,259	1,245	1,263	1,328
White Castle	966	842	887	965	1,101
Other Gulf Coast	94,845	97,300	117,006	126,423	126,231
Total Gulf Coast	283,769	272,358	317,082	353,385	377,886
Northern:					
Big Creek	587	476	483	428	------------
Caddo	7,305	7,066	6,880	6,050	5,638
Cotton Valley	945	771	823	1,850	6,678
Delhi	6,411	4,931	5,086	5,144	5,097
Esperance Point	1,621	1,415	1,337	1,248	977
Haynesville	2,695	3,213	3,003	2,781	2,220
Lake St. John	2,258	2,072	1,845	1,569	2,923
Nebo	1,746	1,468	1,523	1,513	1,348
Olla	1,432	1,432	1,583	1,615	1,328
Rodessa	710	597	683	588	1,611
Sligo	1,340	1,277	1,405	1,388	1,434
Urania	765	766	812	837	770
Other Northern	18,312	16,049	20,121	22,436	17,052
Total Northern	46,127	41,533	45,584	47,447	47,076
Total Louisiana [3]	329,896	313,891	362,666	400,832	424,962

---

[1] Breakdown for individual fields from the Oil and Gas Journal.
[2] Preliminary figures.
[3] Source: 1957–59 Bureau of Mines; 1960–61—Louisiana Conservation Department.

TABLE 17.—Production of crude petroleum in Michigan, by fields

(Thousand barrels)

Field [1]	1957	1958	1959	1960	1961 [2]
Albion	----------	----------	----------	2,080	3,188
Beaver Creek	242	227	340	225	(3)
Coldwater	800	698	619	585	467
Deep River	576	286	225	190	(3)
East Norwich	361	332	294	276	(3)
Kawkawlin	595	583	496	446	372
Kimball Lake	42	22	16	11	(3)
Pentwater	165	135	117	80	(3)
Pulaski	----------	----------	----------	1,628	1,978
Reed City—East Reed City	480	592	560	408	(3)
Rose City	302	292	338	298	(3)
St. Helen	174	142	155	148	(3)
Scipio	----------	----------	----------	3,514	6,090
Stony Lake	247	136	160	145	(3)
Other fields	6,185	5,863	7,119	5,865	6,803
Total Michigan [4]	10,169	9,308	10,439	15,899	18,898

[1] Breakdown for individual fields from the Oil and Gas Journal.
[2] Preliminary figures.
[3] Included in "Other fields."
[4] Source: Michigan Department of Conservation.

TABLE 18.—Production of crude petroleum in Mississippi, by fields

(Thousand barrels)

Field [1]	1957	1958	1959	1960	1961 [2]
Baxterville	4,939	4,993	5,843	5,877	5,949
Belton	1,148	1,248	1,380	1,436	1,136
Brookhaven	2,541	2,218	1,920	1,758	1,571
Bryan	----------	----------	1,222	1,888	3,391
Cranfield	1,206	982	840	733	901
Diamond	----------	959	1,040	1,154	924
Eucutta	1,318	1,611	1,559	1,386	1,261
Heidelberg	3,395	2,916	3,672	3,351	3,974
La Grange and South	1,936	1,649	1,714	1,453	1,471
Little Creek	----------	1,440	5,896	5,774	6,431
Mallalieu	841	739	744	593	562
Maxie-Pistol Ridge	1,277	1,185	1,207	1,000	651
McComb	----------	----------	----------	2,533	2,949
Raleigh	----------	----------	2,168	2,157	1,820
Soso	4,241	4,174	4,651	3,901	3,418
Tinsley	3,884	3,830	3,532	3,347	2,991
Yellow Creek	1,323	1,054	1,020	1,170	1,222
Other fields	10,873	10,514	11,212	12,162	13,870
Total Mississippi [3]	38,922	39,512	49,620	51,673	54,492

[1] Breakdown for individual fields from the Oil and Gas Journal.
[2] Preliminary figures.
[3] Source: Bureau of Mines.

TABLE 19.—Production of crude petroleum in Montana, by fields

(Thousand barrels)

Field	1957	1958	1959	1960	1961 [1]
Big Wall	248	218	204	264	401
Bowes	299	282	333	280	241
Cabin Creek	3,666	4,255	4,350	4,470	4,198
Cat Creek	163	170	151	181	238
Cut Bank	2,515	2,210	2,004	2,078	2,036
Elk Basin	2,603	3,143	4,065	2,718	2,690
Glendive	714	732	505	456	519
Kevin-Sunburst	953	969	833	744	666
Pine	5,326	5,346	4,832	5,112	5,212
Pondera	595	563	521	505	496
Poplar	4,894	4,641	3,775	3,232	2,386
Reagan	213	166	175	190	153
Sumatra	1,306	1,600	2,013	2,145	2,463
Other fields	3,677	3,662	6,096	7,865	9,208
Total Montana [2]	27,172	27,957	29,857	30,240	30,907

[1] Preliminary figures.
[2] Source: Montana Oil & Gas Conservation Commission.

TABLE 20.—Production of crude petroleum in New Mexico, by districts and fields

(Thousand barrels)

District and field [1]	1957	1958	1959	1960	1961 [2]
Southeast:					
Bagley	1,471	1.312	1,188	1,156	1,071
Brunson	870	627	519	----------	----------
Caprock-East	6,362	5,216	6,581	5,525	5,881
Crossroad	1,307	1,402	1,426	1,480	1,941
Denton	9,391	7,968	7,141	6,293	5,841
Dollarhide-West	2,761	2,510	1,855	1,607	1,285
Drinkard	1,850	1,738	1,597	1,465	1,375
Eunice-Monument	12,817	11,674	7,896	7,632	6,048
Fowler	922	787	711	712	680
Gladiola	4,529	7,324	7,046	6,031	5,901
Grayburg-Jackson	845	1,318	1,554	1,707	1,598
Hare	829	583	634	522	380
Hobbs	3,495	3.248	3,399	3,357	3,272
Langlie-Mattix	1,989	1,996	2,289	2,955	2,696
Lovington-East	2,790	2,466	2,337	2.137	1,988
Maljamar	2,227	2,449	2,730	2,820	3,008
Moore	1,187	1,042	1,014	954	863
Saunders-South	1,534	1,781	2,476	2,306	1,993
Vacuum	3,724	3,348	3,709	4,061	4,691
Warren	1,007	1,604	1,194	1,095	944
Other fields	30,333	29,571	36,151	37,159	44,947
Northwest	2,519	8,551	12,245	16,406	15,680
Total New Mexico [3]	94,759	98,515	105,692	107,380	112,083

[1] Breakdown for individual fields from the Oil and Gas Journal.
[2] Preliminary figures.
[3] Source: 1957–60 Bureau of Mines; 1961—New Mexico Oil and Gas Conservation Commission.

TABLE 21.—Production of crude petroleum in Oklahoma, by fields

(Thousand barrels)

Field [1]	1957	1958	1959	1960	1961 [2]
Allen	1,608	1,590	1,676	1,525	1,403
Beebe	707	625	606	697	749
Bradley	3,053	2,741	2,898	2,631	3,048
Burbank	14,280	14,548	14,463	15,676	15,275
Cache Creek	721	827	910	1,041	1,231
Cement	4,061	4,405	4,222	3,836	4,038
Cumberland	1,812	1,474	1,407	1,219	1,213
Cushing	2,650	2,702	2,585	2,515	2,537
Davenport	1,289	959	855	613	654
Dilworth	677	517	453	------	------
Doyle	2,798	2,421	2,241	1,798	1,671
Elk City	4,078	2,806	2,113	1,741	1,398
Eola	3,886	3,188	3,863	3,470	3,624
Fitts	723	800	910	950	983
Garber	849	826	876	761	595
Glenn Pool	2,259	2,773	3,164	3,200	3,368
Golden Trend	17,245	13,106	10,627	11,071	10,202
Grand Valley	------	------	------	------	1,942
Healdton	2,260	2,331	2,256	2,154	2,353
Hennessey	------	------	------	------	2,899
Hewitt	3,240	3,084	2,977	2,938	2,989
Holdenville-East	628	476	412	------	------
Hoover-Northwest	1,863	2,417	2,039	1,329	802
Joiner City	------	------	395	1,561	2,054
Knox	1,232	1,045	941	2,206	2,039
Loco	1,542	1,372	1,290	1,309	1,517
Lucien	817	743	749	710	699
Moore-West	3,250	2,553	1,527	1,275	1,294
Naval Reserve	1,409	1,498	1,667	2,353	2,456
Oklahoma City	3,482	3,290	3,050	2,851	2,617
Olympic	1,573	1,341	1,101	967	787
Payson-East	467	300	423	893	1,421
Seminole:					
Bowlegs	655	619	665	905	1,125
Little River	478	430	390	388	354
St. Louis	1,443	1,410	1,379	1,422	1,449
Seminole	912	876	797	696	666
Sho-Vel-Tum	29,008	25,823	25,175	24,227	24,510
West Edmond	1,292	1,153	1,013	1,407	1,212
Yale-Quay	1,765	1,927	1,700	1,254	979
Other fields	94,649	91,703	94,275	89,324	83,681
Total Oklahoma [3]	214,661	200,699	198,090	192,913	191,834

[1] Breakdown for individual fields from the Oil and Gas Journal.
[2] Preliminary figures.
[3] Source: Bureau of Mines.

TABLE 22.—Production of crude petroleum in Texas by districts and fields

(Thousand barrels)

District [1] and field	1957	1958	1959	1960	1961 [2]
Gulf Coast:					
Amelia	(3)	(3)	(3)	(3)	1,494
Anahuac	5,279	4,028	4,096	3,491	3,385
Barbers Hill	1,662	1,585	1,385	1,339	1,153
Bloomington	1,130	866	853	767	731
Boling	1,433	1,395	1,341	1,237	996
Chocolate Bayou	4,361	4,200	3,953	4,057	3,752
Conroe	9,492	6,979	6,958	6,001	5,749
Dickinson-Gillock	3,571	3,222	2,967	3,077	3,336
Esperson	1,005	1,037	976	909	899
Fairbanks	1,054	894	700	526	(3)
Fannette	1,511	1,760	1,578	1,731	1,764
Francitas	1,272	846	815	641	604
Gohlke, Helen	1,715	1,244	1,246	1,041	899
Goose Creek	2,736	2,617	2,541	2,468	2,296
Greta	2,221	1,668	1,905	1,471	1,365
Hankamer	1,023	1,034	1,064	1,203	1,358
Hastings	10,304	7,919	9,318	7,741	7,671
Heyser	(3)	(3)	(3)	1,300	1,327
High Island	3,554	3,864	3,958	4,600	5,119
Houston-North-South	1,227	1,045	950	(3)	(3)
Hull	3,668	3,653	3,222	2,632	2,647
Humble	1,074	1,065	1,151	1,184	1,260
Liberty, South	4,100	5,657	4,565	3,560	3,068
Lolita	1,378	1,407	1,703	1,505	1,388
Lovell Lake	(3)	(3)	751	416	561
McFadden	1,138	796	477	459	553
Manvel	1,469	1,069	1,099	1,055	1,032
Markham	1,819	1,957	1,701	1,356	1,204
O'Connor, Tom	8,604	5,106	7,049	7,697	8,533
Old Ocean	5,674	4,707	4,471	3,709	3,923
Oyster Bayou	2,612	2,044	2,148	1,822	1,773
Pierce Junction	6,720	5,007	3,846	2,962	2,654
Placedo	1,371	1,057	910	791	773
Port Neches	1,002	921	881	937	792
Raccoon Bend	1,694	1,321	1,348	1,293	1,412
Refugio-Fox	2,055	1,923	1,824	1,595	1,491
Saratoga	1,618	1,431	1,119	937	802
Silsbee	937	1,221	2,047	1,460	693
Sour Lake	1,319	1,194	1,151	1,039	951
Stowell	1,198	603	615	507	(3)
Sugarland	853	608	616	518	503
Sugar Valley	921	715	695	637	616
Thompson	8,193	6,000	5,979	5,186	5,293
Tomball	2,035	1,498	1,619	1,523	1,533
Village Mills	2,730	2,063	2,137	1,578	1,757
Webster	9,511	6,760	6,865	5,801	5,628
West Columbia	2,475	2,687	2,934	2,942	2,780
West Ranch	6,190	4,641	4,713	4,137	5,607
Withers-Magnet	3,162	2,458	2,230	1,629	1,589
Other Gulf Coast	69,391	63,614	66,530	62,701	64,507
Total Gulf Coast	209,461	179,386	183,000	167,168	169,221
East Coast:					
East Texas Proper	70,109	52,593	53,691	48,704	48,583
Cayuga	999	925	937	899	812
Ham Gossett	659	486	462	419	(3)
Hawkins	14,786	10,687	10,796	9,174	8,909
Long Lake	1,779	645	681	524	507
New Hope	2,162	1,993	1,933	1,533	1,318
Pewitt Ranch	927	700	661	581	557
Picton	1,189	983	808	603	465
Quitman	2,192	2,117	2,478	2,909	3,248
Talco	4,523	3,977	4,280	4,109	4,321
Van	7,823	5,683	5,700	4,885	4,798
Waskom	872	889	902	709	802
Woodlawn	419	380	384	(3)	(3)
Other East Texas	21,919	24,242	22,690	26,175	28,461
Total East Texas	130,358	106,300	106,403	101,224	102,781
Central Texas:					
Big Foot	1,610	2,021	1,686	1,435	1,313
Charlotte	2,071	1,541	1,474	1,255	1,172
Darst Creek	3,450	3,465	3,331	3,674	3,493

See footnotes at end of table.

TABLE 22.—Production of crude petroleum in Texas by districts and fields—Con.

District [1] and field	1957	1958	1959	1960	1961 [2]
Central Texas—Continued					
Luling	2,598	2,444	1,832	1,568	1,445
Other Central Texas	8,727	6,916	7,062	8,538	8,628
Total Central Texas	18,456	16,387	15,385	16,470	16,051
South Texas:					
Aqua Dulce	1,479	1,171	1,038	947	889
Flour Bluff	872	750	(3)	(3)	(3)
Fulton Beach	4,340	2,415	2,051	2,265	2,253
Garcia	834	645	(3)	(3)	(3)
Hoffman	1,440	1,210	1,384	1,240	1,226
Kelsey	3,359	2,457	2,568	2,295	2,738
London	1,083	728	(3)	(3)	(3)
Midway	940	644	(3)	(3)	(3)
Mirando	----------	----------	3,335	4,763	4,676
Mustang Island	2,246	1,755	2,207	1,515	1,537
Plymouth	4,757	3,992	6,157	6,385	5,811
Portilla	2,936	2,228	1,353	2,085	2,239
Saxet-Saxet Frio	1,312	847	790	685	712
Seeligson	8,440	7,932	7,838	8,050	15,027
Stratton	1,999	1,500	1,746	1,143	681
Sun	1,673	1,439	1,644	1,941	2,151
Taft	929	744	899	1,929	1,484
White Point	3,426	2,417	2,275	2,109	2,137
Willamar and West	2,072	1,491	1,512	1,346	1,412
Other South Texas	38,562	35,125	34,262	29,626	23,684
Total South Texas	82,699	69,490	71,059	68,324	68,657
North Texas	132,457	120,176	120,307	117,302	115,070
Panhandle	38,481	38,587	36,750	38,570	38,772
West Texas:					
Abell	1,590	1,465	1,366	1,251	1,346
Adair	2,107	1,552	1,915	1,886	1,851
Andector	4,500	2,719	2,815	3,254	3,270
Anton Irish-Anton	2,600	2,000	2,068	1,789	1,750
Bakke	----------	----------	----------	----------	4,932
Benedum	1,982	1,657	1,520	1,282	1,164
Block 31	5,690	5,695	5,786	5,787	5,763
Bronte	1,865	1,261	1,252	1,060	708
Cedar Lake	1,385	1,061	1,088	1,152	1,348
Cogdell	6,908	4,972	6,188	5,281	5,211
Cowden	9,764	9,178	10,460	11,480	12,435
Cree-Sykes	1,241	761	807	710	635
Diamond M	8,465	5,779	5,903	6,123	6,176
Dollarhide	4,139	3,227	3,218	3,018	2,735
Dune	----------	----------	----------	----------	1,501
Embar	1,862	1,522	1,702	1,290	1,128
Emma	3,452	2,621	3,033	2,749	2,737
Fort Chadborne	3,788	3,806	3,369	2,745	2,656
Fort Stockton	1,272	976	1,084	994	809
Foster	4,282	3,388	3,049	2,874	2,888
Fuhrman	4,471	3,878	3,969	3,743	3,463
Fullerton	5,977	5,700	6,087	5,834	5,977
Garza	2,625	2,104	2,040	1,766	1,687
Goldsmith	20,434	20,827	23,890	22,253	21,319
Good	1,248	1,022	1,381	1,549	1,393
Harper	2,424	1,999	1,927	1,497	1,256
Headlee	----------	----------	3,002	4,830	5,040
Hendrick	1,351	1,522	1,625	1,665	1,522
Howard-Glasscock	6,683	6,865	6,310	6,167	6,583
Hulldale Penn	1,763	1,278	1,340	1,255	973
Iatan—East and North	----------	----------	1,834	1,788	1,779
Jameson	4,822	3,360	2,971	2,560	2,351
Jordan	3,378	3,007	2,934	2,648	2,561
Kelly Snyder	26,827	19,568	21,072	17,557	16,924
Kermit	4,841	4,510	5,231	5,413	5,338
Keystone	7,005	6,214	5,962	5,679	5,720
Lea	1,359	1,047	963	830	814
Levelland	7,892	6,584	6,427	5,842	5,907
Luther	1,073	900	910	834	817
McCamey	1,881	1,947	1,885	1,889	1,894
McElroy	10,751	9,220	9,249	8,882	8,347
McFarland	3,708	5,954	2,134	1,534	1,362
Mabee	1,093	1,112	1,636	1,533	1,701
Magutex	2,132	1,604	2,223	2,011	2,064
Martin	2,067	1,515	1,456	1,234	1,185
Means	6,495	5,058	4,803	4,046	4,124
Midland Farms	7,143	5,993	6,746	6,076	6,169

See footnotes at end of table.

TABLE 22.—Production of crude petroleum in Texas by districts and fields—Con.

District [1] and field	1957	1958	1959	1960	1961 [2]
West Texas—Continued					
Pegasus	4, 490	3, 342	3, 984	4, 047	4, 896
Penwell	2, 049	2, 245	2, 679	3, 018	2, 863
Prentice	5, 164	4, 322	4, 284	3, 470	3, 265
Reinecke	1, 401	1, 008	1, 014	860	830
Robertson	1, 652	2, 143	3, 033	3, 179	3, 436
Russell	6, 874	5, 137	5, 206	4, 903	5, 320
Salt Creek	3, 679	2, 840	3, 952	3, 333	3, 205
Sand Hills	6, 729	5, 334	5, 294	4, 788	5, 265
Seminole	5, 246	3, 836	3, 802	3, 261	3, 233
Shafter Lake	3, 019	2, 375	2, 487	2, 132	2, 048
Sharon Ridge	1, 966	2, 500	3, 857	3, 146	3, 450
Slaughter	10, 180	8, 237	8, 712	8, 188	8, 211
Sprayberry Trend	19, 835	15, 021	12, 738	10, 162	9, 902
Three Bar	1, 036	758	858	657	657
Tippett	-----	-----	1, 684	1, 380	1, 289
Todd	1, 939	1, 298	1, 462	1, 414	1, 354
Triple N	1, 342	1, 406	1, 626	1, 332	1, 219
TXL	5, 502	4, 449	4, 425	3, 870	3, 948
University	4, 122	3, 419	3, 682	3, 602	3, 872
Vealmoor—East	2, 903	2, 088	2, 072	1, 780	1, 682
Waddell	2, 635	2, 903	2, 526	2, 669	2, 309
Ward-Estes	14, 245	17, 561	19, 544	19, 186	19, 728
Wasson	14, 377	11, 566	12, 830	12, 005	12, 041
Welch	1, 858	1, 616	2, 087	1, 909	1, 906
Westbrook	1, 869	1, 577	1, 597	1, 418	1, 322
Wilshire	1, 949	1, 405	1, 390	1, 320	1, 206
World	1, 814	1, 734	1, 800	1, 702	1, 665
Yarbrough	1, 900	1, 372	1, 294	779	999
Yates	8, 818	6, 396	6, 343	5, 495	5, 292
Other West Texas	117, 027	115, 524	126, 182	127, 776	131, 739
Total West Texas	461, 955	409. 840	439, 074	418. 421	427, 465
Total Texas [4]	1, 073, 867	940, 166	971, 978	927, 479	938, 017

---

[1] See description of Districts on p. 8.

[2] Preliminary figures.

[3] Includedi n "Other fields."

[4] Source: As reported by the companies to the Bureau of Mines.

TABLE 23.—Production of crude petroleum in Wyoming, by fields

(Thousand barrels)

Field [1]	1957	1958	1959	1960	1961 [2]
Beaver Creek	2, 289	2, 391	2, 389	2, 782	3, 079
Big Muddy	1, 915	1, 781	2, 260	2, 223	1, 914
Big Sand Draw	2, 648	2, 586	2, 489	1, 982	1, 731
Bonanza	5, 075	4, 801	3, 497	2, 695	1, 896
Byron Garland	6, 978	6, 474	7, 820	7, 907	7, 826
Cole Creek-Northeast and South	985	879	746	318	385
Donkey Creek	-----	1, 390	1, 852	2, 567	1, 700
Elk Basin	12, 716	15, 518	18, 214	18, 803	20, 603
Fiddler Creek	-----	77	724	1, 217	1, 676
Four Bear	-----	-----	1, 744	3, 083	3, 492
Frannie	2, 695	2, 647	2, 812	2, 718	2, 567
Gebo	1, 165	1, 067	1, 163	1, 226	1, 148
Glenrock-South	3, 091	2, 711	2, 509	2, 017	1, 975
Grass Creek	4, 000	3, 899	4, 619	4, 543	4, 602
Hamilton Dome	5, 617	8, 577	9, 294	12, 045	10, 568
Hidden Dome	(3)	(3)	2, 867	2, 251	1, 933
Lance Creek	1, 539	1, 338	1, 222	1, 188	800
Little Buffalo	1, 250	2, 105	2, 250	2, 039	2, 512
Lost Soldier-Bairoil	6, 513	6, 407	6, 135	5, 989	5, 666
Oregon Basin	5, 168	4, 719	5, 183	5, 234	5, 875
Salt Creek	6, 796	8, 486	7, 500	9, 515	9, 235
Steamboat Butte	3, 493	3, 259	3, 188	2, 901	3, 012
Sussex Meadow	6, 728	5, 564	6, 955	6, 387	5, 196
Winkleman Dome	2, 644	3, 044	3, 353	3, 114	2, 726
Other fields	26, 279	25, 852	25, 265	29, 166	40, 472
Total Wyoming [4]	109, 584	115, 572	126, 050	133, 910	142, 589

---

[1] Breakdown for individual fields from the Oil and Gas Journal.

[2] Preliminary figures.

[3] Included in "Other fields."

[4] Source: Bureau of Mines.

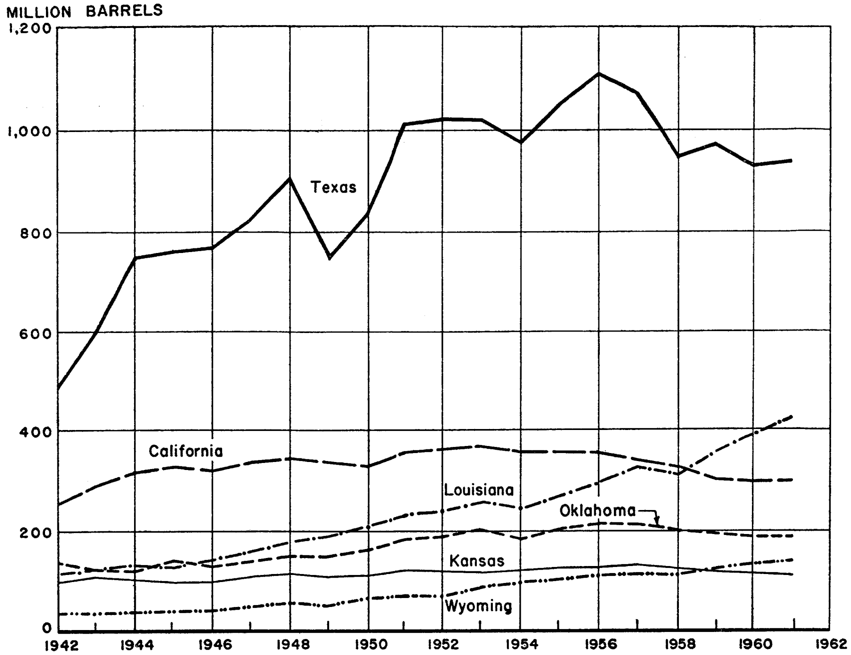

FIGURE 2.—Production of crude petroleum in the United States, 1942–61, by principal producing States.

WELLS

Fewer wells were drilled during 1961, but the decline from the preceding year was only 0.3 percent although the number of wells drilled in 1960 was 12.1 percent less than in 1959. The number of wells drilled, including oil, condensate, gas wells and dry, but excluding service wells totaled 43,871 in 1961. The proportion of dry holes drilled to the total declined from 39.9 percent in 1960 to 39.0 percent in 1961.

Drilling activity increased in the midcontinent area and also in the east and west coast States. Oklahoma and Kansas reported 1,087 more wells drilled in 1961 while 915 fewer wells were drilled in Texas.

A total of 594,917 oil wells were reported as producing an average daily production of 12.1 barrels as of December 31, 1961, compared with 591,158 wells producing at a daily average rate of 12.0 barrels at the end of 1960.

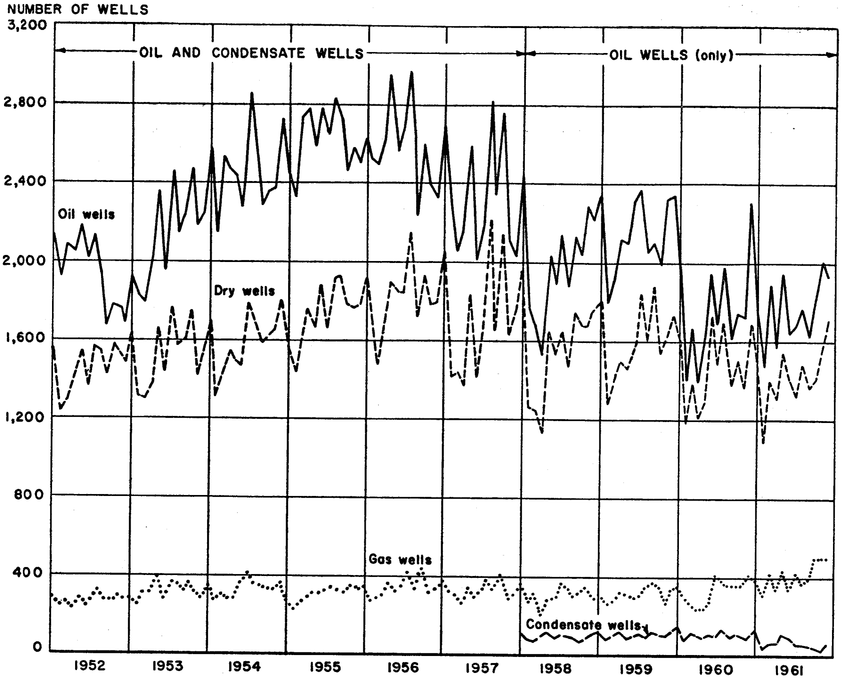

FIGURE 3.—Wells drilled for oil and gas in the United States, 1952–61, by months.

TABLE 24.—Wells drilled for oil and gas in the United States, by months

Wells	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	
													Number	Percent
1960														
Oil	1,971	1,393	1,677	1,403	1,638	1,961	1,713	1,981	1,627	1,759	1,732	2,331	21,186	48.1
Condensate	161	71	118	99	95	114	100	127	107	116	103	95	1,306	3.0
Gas	347	293	263	240	242	272	406	387	361	363	362	416	3,952	9.0
Dry	1,610	1,191	1,372	1,203	1,283	1,727	1,507	1,713	1,406	1,498	1,377	1.687	17,574	39.9
Total	4,089	2,948	3,430	2,945	3,258	4,074	3,726	4,208	3,501	3,736	3,574	4,529	44,018	100.0
1961														
Oil	1,745	1,476	1,887	1,576	1,942	1,641	1,675	1,764	1,625	1,825	2,012	1,933	21,101	48.1
Condensate	135	36	63	67	108	93	60	60	51	34	19	23	749	1.7
Gas	389	311	416	341	432	336	417	373	395	503	502	500	4,915	11.2
Dry	1,512	1,095	1,401	1,311	1,541	1,410	1,318	1,480	1,360	1,407	1,557	1,714	17,106	39.0
Total	3,781	2,918	3,767	3,295	4,023	3,480	3,470	3,677	3,431	3,769	4,090	4,170	43,871	100.0

Source: Oil and Gas Journal.

TABLE 25.—Wells drilled for oil and gas in the United States, by States and districts

State and district	1960					1961				
	Oil	Condensate	Gas	Dry	Total	Oil	Condensate	Gas	Dry	Total
Alabama	38	-------	-------	7	45	35	-------	-------	9	44
Alaska	12	-------	3	7	22	26	-------	5	17	48
Arizona	3	-------	1	31	35	2	-------	1	20	23
Arkansas	292	2	36	279	609	215	-------	43	286	544
California	1,160	1	114	419	1,694	1,410	-------	157	428	1,995
Colorado	119	9	116	462	706	93	2	114	453	662
Florida	-------	-------	-------	5	5	-------	-------	-------	8	8
Georgia	-------	-------	-------	1	1	-------	-------	-------	1	1
Idaho	-------	-------	-------	1	1	-------	-------	-------	-------	-------
Illinois	776	-------	8	1,055	1,839	725	-------	13	824	1,562
Indiana	345	-------	12	699	1,056	274	-------	6	506	786
Iowa	-------	-------	-------	4	4	-------	-------	-------	-------	-------
Kansas	2,040	1	200	1,818	4,059	2,238	2	324	1,774	4,338
Kentucky	768	-------	264	722	1,754	380	-------	238	745	1,363
Louisiana:										
Gulf Coast	1,064	333	52	797	2,246	1,020	126	206	861	2,213
Northern	621	2	230	598	1,451	725	24	276	796	1,821
Total Louisiana	1,685	335	282	1,395	3,697	1,745	150	482	1,657	4,034
Michigan	357	-------	26	428	811	200	-------	68	478	746
Mississippi	308	30	9	347	694	201	24	18	331	574
Missouri	4	-------	-------	25	29	-------	-------	-------	38	38
Montana	132	-------	8	212	352	167	-------	4	236	407
Nebraska	279	-------	2	613	894	355	-------	2	647	1,004
Nevada	-------	-------	-------	3	3	1	-------	-------	14	15
New Mexico:										
West	197	32	351	96	676	227	2	406	151	786
East	817	14	23	305	1,159	678	3	29	310	1,020
Total New Mexico	1,014	46	374	401	1,835	905	5	435	461	1,806
New York	126	-------	28	60	214	230	-------	16	28	274
North Carolina	-------	-------	-------	3	3	-------	-------	-------	-------	-------
North Dakota	159	1	-------	122	282	131	-------	-------	127	258
Ohio	454	-------	260	304	1,018	565	-------	194	290	1,049
Oklahoma	2,284	72	434	1,472	4,262	2,820	79	514	1,657	5,070
Oregon	-------	-------	-------	11	11	-------	-------	-------	2	2
Pennsylvania	256	-------	269	91	616	237	-------	212	77	526
South Dakota	7	-------	-------	15	22	-------	-------	-------	6	6
Tennessee	10	-------	2	80	92	5	-------	8	60	73
Texas:										
Gulf Coast	633	264	170	850	1,917	743	172	273	816	2,004
West Texas	2,698	108	58	998	3,862	2,464	58	107	932	3,561
East Texas	718	92	6	485	1,301	632	60	31	430	1,153
Other districts	3,831	343	498	3,422	8,094	3,717	189	661	2,974	7,541
Total Texas	7,880	807	732	5,755	15,174	7,556	479	1,072	5,152	14,259
Utah	117	-------	23	102	242	90	3	35	124	252
Virginia	-------	-------	8	-------	8	-------	-------	2	-------	2
Washington	-------	-------	-------	5	5	-------	-------	-------	12	12
West Virginia	78	-------	686	94	858	118	-------	857	126	1,101
Wisconsin	-------	-------	-------	-------	-------	-------	-------	-------	6	6
Wyoming	483	2	55	526	1,066	377	5	95	506	983
Total United States	21,186	1,306	3,952	17,574	44,018	21,101	749	4,915	17,106	43,871

Source: Oil and Gas Journal.

TABLE 26.—Producing oil wells in the United States and average production per well per day, by States

State	Producing oil wells			
	1960		1961 [1]	
	Approximate number of producing oil wells, Dec. 31	Average production per well per day (barrels) [2]	Approximate number of producing oil wells, Dec. 31	Average production per well per day (barrels) [2]
Alabama	380	55.3	418	47.6
Alaska	17	138.9	45	559.0
Arkansas	6,381	13.1	6,330	12.6
California	37,771	22.3	38,184	21.6
Colorado	2,021	63.1	2,023	63.3
Illinois	31,995	6.6	31,911	6.8
Indiana	5,176	6.4	5,679	5.6
Kansas	40,460	7.7	40,933	7.6
Kentucky	20,571	2.8	19,857	2.5
Louisiana:				
Gulf Coast	12,232	82.8	12,843	82.6
Northern	12,450	10.5	11,897	10.6
Total Louisiana	24,682	45.5	24,740	47.1
Michigan	4,348	10.3	4,301	12.0
Mississippi	3,086	51.5	2,819	50.6
Montana	3,707	21.8	3,342	24.0
Nebraska	1,571	43.0	1,860	38.9
New Mexico:				
Southeastern	12,840	20.4	13,630	20.0
Northwestern	1,446	33.7	1,665	27.6
Total New Mexico	14,286	21.7	15,295	20.8
New York	18,579	.3	17,829	.3
North Dakota	1,451	42.3	1,683	41.2
Ohio	16,743	.9	16,682	.8
Oklahoma	77,720	6.9	79,387	6.7
Pennsylvania	66,260	.2	63,576	.2
Texas:[3]				
Gulf Coast	18,881	24.2	19,176	24.4
East Texas proper	19,082	7.0	19,488	6.9
West Texas	62,459	18.6	64,158	18.5
Other districts	92,512	8.8	93,574	8.6
Total Texas	192,934	13.3	196,396	13.2
Utah	796	137.6	795	114.0
West Virginia	12,560	.5	12,762	.6
Wyoming	7,475	50.3	7,880	50.9
Other States	[4] 188	12.0	[5] 190	13.9
Total United States	591,158	12.0	594,917	12.1

[1] Preliminary figures.
[2] Based on the average number of wells during the year.
[3] Division of the Texas Railroad Commissions.
[4] Arizona, 3; Florida, 11; Missouri, 120; Nevada, 2; South Dakota, 19; Tennessee, 27; Virginia, 5; Washington, 1.
[5] Arizona, 5; Florida, 11; Missouri, 116; Nevada, 4; South Dakota, 19; Tennessee, 30; Virginia, 5; Washington, 0.

CONSUMPTION AND DISTRIBUTION

The total demand for crude oil in the United States in 1961 was 8,215,000 barrels daily compared with 8,098,000 barrels in 1960. The demand for domestic crude oil increased 1.1 percent to 7,164,000 barrels daily, and the demand for foreign crude oil was 1,051,000, a gain of 3.5 percent.

Foreign crude oil supplied 12.8 percent of the total crude-oil requirement in 1961.

Runs to Stills.—Refiners processed an average of 8,184,000 barrels of crude oil daily in 1961 using 7,135,000 barrels daily of domestic crude oil and 1,049,000 barrels daily of foreign-origin crude oil.

Distribution.—The Bureau of Mines collects data on receipts of domestic and foreign crude petroleum at refineries in the United

TABLE 27.—Runs to stills of crude petroleum in the United States in 1961, by districts and month [1]

(Thousand barrels)

District [2]	January	February	March	April	May	June	July	August	September	October	November	December	Total
East Coast:													
Domestic	15,328	13,249	15,259	14,870	15,115	12,994	13,569	14,919	13,180	15,045	14,386	17,329	175,243
Foreign	20,435	19,822	19,945	17,633	18,687	18,825	21,301	21,380	20,053	18,732	18,931	18,936	234,680
Total East Coast	35,763	33,071	35,204	32,503	33,802	31,819	34,870	36,299	33,233	33,777	33,317	36,265	409,923
Appalachian No. 1:													
Domestic	3,177	2,751	3,150	2,927	2,646	2,792	2,157	2,501	2,829	2,944	2,957	3,093	33,924
Foreign	---------	---------	---------	43	316	173	329	258	296	438	318	311	2,482
Total Appalachian No. 1	3,177	2,751	3,150	2,970	2,962	2,965	2,486	2,759	3,125	3,382	3,275	3,404	36,406
Appalachian No. 2	3,010	2,370	2,985	2,843	3,073	2,661	3,365	3,374	3,247	3,229	2,628	3,070	35,855
Indiana, Illinois, Kentucky, etc.:													
Domestic	47,275	42,688	45,065	39,405	42,437	40,292	45,866	47,307	45,083	45,005	44,214	47,331	531,968
Foreign	565	755	1,035	847	807	1,023	1,162	1,239	1,079	1,367	1,332	1,597	12,808
Total Indiana, Illinois, Kentucky, etc	47,840	43,443	46,100	40,252	43,244	41,315	47,028	48,546	46,162	46,372	45,546	48,928	544,776
Minnesota, Wisconsin, North Dakota and South Dakota:													
Domestic	2,222	1,749	2,447	1,878	1,503	2,596	2,233	2,518	2,291	2,449	2,217	2,063	26,166
Foreign	1,908	1,859	1,508	1,521	1,229	1,309	1,473	1,536	1,276	1,490	1,412	2,059	18,580
Total Minnesota, Wisconsin, North Dakota and South Dakota	4,130	3,608	3,955	3,399	2,732	3,905	3,706	4,054	3,567	3,939	3,629	4,122	44,746
Oklahoma, Kansas, etc	23,776	20,883	21,187	19,907	21,292	22,472	23,523	23,351	22,195	20,201	20,855	23,088	262,730
Texas Inland	9,124	8,131	9,697	9,092	9,431	9,415	9,774	9,722	9,106	9,409	8,859	9,112	110,872
Texas Gulf Coast:													
Domestic	61,374	57,300	59,679	56,617	58,941	53,331	58,612	60,837	48,316	59,528	56,006	56,747	687,288
Foreign	130	174	80	104	98	73	5	11	47	---------	32	---------	754
Total Texas Gulf Coast	61,504	57,474	59,759	56,721	59,039	53,404	58,617	60,848	48,363	59,528	56,038	56,747	688,042
Louisiana Gulf Coast:													
Domestic	21,619	20,566	20,786	19,884	21,233	20,986	21,343	21,173	20,112	22,110	21,816	22,515	254,143
Foreign	158	110	66	108	49	68	89	142	112	123	73	137	1,235
Total Louisiana Gulf Coast	21,777	20,676	20,852	19,992	21,282	21,054	21,432	21,315	20,224	22,233	21,889	22,652	255,378
Arkansas, Louisiana Inland, etc	3,372	3,154	3,599	2,942	3,715	3,528	3,628	3,617	3,282	3,434	3,415	3,429	41,115
New Mexico	654	724	747	788	758	764	772	825	807	821	708	538	8,906

See footnotes at end of table.

TABLE 27.—Runs to stills of crude petroleum in the United States in 1961, by districts and month [1]—Continued

District [2]	January	February	March	April	May	June	July	August	September	October	November	December	Total
Rocky Mountain:													
Domestic	8,983	7,831	8,349	7,729	8,801	8,987	9,090	9,390	8,658	8,283	8,238	9,270	103,609
Foreign	3	2	1	3	9	---------	4	1	4	3	---------	---------	30
Total Rocky Mountain	8,986	7,833	8,350	7,732	8,810	8,987	9,094	9,391	8,662	8,286	8,238	9,270	103,639
West Coast:													
Domestic	27,187	25,150	26,938	27,257	28,872	28,484	28,026	27,949	26,658	28,662	28,172	28,953	332,308
Foreign	9,049	7,488	8,441	8,179	9,961	8,806	10,653	10,059	10,649	10,261	9,573	9,343	112,462
Total West Coast	36,236	32,638	35,379	35,436	38,833	37,290	38,679	38,008	37,307	38,923	37,745	38,296	444,770
Total United States:													
Domestic	227,101	206,546	219,888	206,139	217,817	209,302	221,958	227,483	205,764	221,120	214,471	226,538	2,604,127
Foreign	32,248	30,210	31,076	28,438	31,156	30,277	35,016	34,626	33,516	32,414	31,671	32,383	383,031
Grand total: 1961	259,349	236,756	250,964	234,577	248,973	239,579	256,974	262,109	239,280	253,534	246,142	258,921	2,987,158
1960	256,659	233,880	245,423	238,809	246,847	243,773	257,522	255,748	242,999	245,157	236,789	248,928	2,952,534
Daily average, 1961	8,366	8,456	8,096	7,819	8,031	7,986	8,289	8,455	7,976	8,179	8,205	8,352	8,184

---

[1] Preliminary figures.

[2] Where no breakdown is shown, runs were all domestic crude.

States. These receipts include the crude runs to stills, a small quantity used as refinery fuel, and any increase in crude stocks at refineries. Classification of receipts, by State of origin, shows receipts from local production (intrastate), receipts from other States (interstate), and receipts of imported crude. Classification by method of transportation indicates the final receipts by water, pipeline, and tank car and truck. Receipts of domestic crude by water usually were moved by pipeline from the point of production to the point of water shipment.

Receipts of domestic and foreign crude petroleum at refineries totaled 2,987.0 million barrels in 1961; foreign crude represented 12.8 percent of this total. The refineries processed 2,987.2 million barrels and reported 1.6 million barrels used for refinery fuel and losses; the difference was 1.8 million barrels withdrawn from stocks.

Refineries received 74.4 percent of their supply of crude oil by pipeline, 24.2 percent by water; and the remainder, by tank cars and trucks.

The major waterborne shipments were from the gulf coast to the east coast and between States in the gulf-coast districts. There are also interstate and intrastate shipments by water on the west coast and Mississippi River.

All foreign crude receipts into the east coast and the major part of those into the gulf coast are received by water. Refineries in District II, which comprises the Great Lakes and the midcontinent areas, receive most of their foreign crude by pipeline from Canada; however, some is barged up the river from gulf-coast ports where it arrived by tanker. Very little foreign crude is processed at refineries in the Rocky Mountain States; such crude as is used arrives at the refineries by rail from Canada. West coast refiners received 70.2 percent of their foreign crude supply by water; the rest was received by pipeline at refineries near the Canadian border.

Demand by States of Origin.—Distribution of domestic crude oil by refining States and districts can be analyzed from receipts of crude oil at refineries. When long-distance shipments are involved, various crudes may be mixed in transit or storage, and identification by origin may be only approximate.

TABLE 28.—Receipts of domestic and foreign crude petroleum at refineries in the United States

(Million barrels)

Method of transportation	1957	1958	1959	1960	1961 [1]
By water:					
Intrastate	152.2	141.4	134.1	125.8	136.0
Interstate	253.7	233.7	242.7	261.6	268.3
Foreign	318.0	313.4	316.8	330.0	317.1
Total by water	723.9	688.5	693.6	717.4	721.4
By pipeline:					
Intrastate	1,296.7	1,208.3	1,282.8	1,291.6	1,286.1
Interstate	790.6	808.3	868.5	857.4	871.9
Foreign	47.8	30.4	33.4	40.6	64.1
Total by pipeline	2,135.1	2,047.0	2,184.7	2,189.6	2,222.1
By tank cars and trucks:					
Intrastate	31.9	27.6	31.8	33.9	34.9
Interstate	8.0	9.2	9.2	10.1	8.1
Foreign	0.1				0.5
Total by tank cars and trucks	40.0	36.8	41.0	44.0	43.5
Grand total	2,899.0	2,772.3	2,919.3	2,951.0	2,987.0

[1] Preliminary figures.

TABLE 29.—Refinery receipts of domestic crude oil by States and districts, 1961

(Thousand barrels)

Receiving State and district	Total domestic receipts	Intrastate receipts	Interstate receipts from—																		
			Ala. and Miss.	Ark.	Calif., Nev. and Alaska	Colo.	Fla. and N.Y.	Ill.	Ind. and Mich.	Kans.	Ky. and Ohio	La.	Mont.	Nebr., N. Dak. and S. Dak.	N. Mex.	Okla.	Texas	Utah	W. Va.	Wyo.	Total
Delaware, Massachusetts, Rhode Island	17,849	------	656	------	------	------	------	------	------	------	------	6,310	------	------	------	------	10,883	------	------	------	17,849
Florida, Georgia, South Carolina, Virginia	1,893	------	1,893	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	1,893
Maryland	1,098	------	1,068	------	------	------	------	------	------	------	------	30	------	------	------	------	------	------	------	------	1,098
New Jersey	63,267	------	36	------	------	------	109	------	------	------	------	23,016	------	------	------	------	39,411	695	------	------	63,267
New York:																					
East	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
West	16,865	------	------	------	------	------	------	2,790	------	1,872	------	------	4,648	------	------	4,430	3,125	------	------	------	16,865
Pensylvania:																					
East	91,546	------	6,262	------	------	------	------	------	------	------	------	21,433	------	------	306	------	63,545	------	------	------	91,546
West	14,971	5,975	------	------	------	535	1,487	1,782	------	------	1,291	------	2,050	335	------	523	------	------	993	------	8,996
West Virginia	2,245	1,507	------	------	------	------	------	------	------	------	738	------	------	------	------	------	------	------	------	------	738
Total, District 1	209,734	7,482	9,915	------	------	535	1,596	4,572	------	1,872	2,029	50,789	6.698	335	306	4,953	116,964	695	993	------	202,252
Illinois	205,296	29,906	------	------	------	2,450	------	------	1,213	10,950	------	1,630	446	1,475	15,045	27,172	95,544	1,809	------	17,656	175,390
Indiana	155,692	1,347	------	------	------	9,681	------	7,826	507	20,496	33	------	9,621	10,045	7,394	29,441	20,332	------	------	38,969	154,345
Kansas	111,013	85,817	------	------	------	4,224	------	------	------	------	------	------	------	474	7,023	9,330	3,275	------	------	870	25,196
Kentucky, Tennessee	41,571	19,484	4,018	796	------	------	------	------	2,221	------	2	13,581	------	------	------	------	492	------	------	977	22,087
Michigan	42,268	18,453	------	------	------	62	------	2,650	------	------	------	------	152	108	------	------	7,962	------	------	12,881	23,815
Minnesota, Wisconsin	10,666	------	------	------	------	------	------	------	------	------	------	------	345	7,343	------	------	------	------	------	2,978	10,666
Missouri	20,380	------	------	------	------	------	------	------	------	124	------	------	------	------	8,855	1,677	5,923	------	------	3,801	20,380
Nebraska	911	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	911	911
North Dakota	15,578	15,578	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Ohio:																					
East	35,903	2,814	------	------	------	335	------	26,901	------	182	------	3,800	2	------	------	408	------	------	------	1,461	33,089
West	87,523	25	599	1,464	------	2,902	------	14,206	116	71	758	14,476	------	4,266	592	9,588	36,504	------	------	1,956	87,498
Oklahoma	129,788	93,387	------	------	------	192	------	------	------	10,397	------	------	------	185	1,165	------	19,241	5,221	------	------	36,401
Total, District 2	856,589	266,811	4,617	2,260	------	19,846	------	51,583	4,057	42,220	793	33,487	10,566	23,896	40,074	77,616	189,273	7,030	------	82,460	589,778

Alabama, Mississippi	11,328	9,534	1,483	------	------	------	------	------	------	------	------	311	------	------	------	------	------	------	----	------	1,794
Arkansas	27,620	26,743	------	------	------	------	------	------	------	------	------	877	------	------	------	------	------	------	----	------	877
Louisiana	256,702	179,221	34,422	7,552	------	------	------	------	------	------	------	------	------	------	------	36	35,471	------	----	------	77,481
New Mexico	9,010	9,010	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	----	------	------
Texas	799,042	608,821	1,281	------	------	------	------	------	------	------	------	123,660	------	------	47,833	11,754	------	5,642	----	51	190,221
Total, District 3	1,103,702	833,329	37,186	7,552	------	------	------	------	------	------	------	124,848	------	------	47,833	11,790	35,471	5,642	----	51	270,373
Colorado	13,281	776	------	------	------	------	------	------	------	------	------	------	886	------	139	------	------	------	----	11,480	12,505
Montana	23,818	8,707	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	----	15,111	15,111
Utah	30,149	5,621	------	------	------	19,030	------	------	------	------	------	------	------	------	67	------	------	------	----	5,431	24,528
Wyoming	36,159	34,352	------	------	------	1,807	------	------	------	------	------	------	------	------	------	------	------	------	----	------	1,807
Total, District 4	103,407	49,456	------	------	------	20,837	------	------	------	------	------	------	886	------	206	------	------	------	----	32,022	53,951
California	327,371	299,993	------	------	3,250	------	------	------	------	------	------	------	------	------	11,826	------	------	12,302	----	------	27,378
Washington, Oregon, Hawaii	4,520	------	------	------	4,306	------	------	------	------	------	------	------	------	------	90	------	------	124	----	------	4,520
Total, District 5	331,891	299,993	------	------	7,556	------	------	------	------	------	------	------	------	------	11,916	------	------	12,426	----	------	31,898
Total, 1961	2,605,323	1,457,071	51,718	9,812	7,556	41,218	1,596	56,155	4,057	44,092	2,822	209,124	18,150	24,231	100,335	94,359	341,708	25,793	993	114,533	1,148,252
Daily average, 1961	7,138	3,992	141	27	21	113	4	154	11	121	8	573	49	67	275	258	936	71	3	314	3,146
Daily average, 1960	7,050	3,965	141	32	14	114	4	154	14	116	13	562	48	60	271	245	926	77	1	293	3,085

TABLE 30.—Crude runs to stills and refinery receipts of crude oil by origin of the crude and method of transportation by States and districts, 1961

(Thousand barrels)

Receiving State and District	Crude runs to stills	Refinery fuel use and losses	Refinery receipts of domestic trade								Refinery receipts of foreign crude
			By State of origin of domestic crude	Change in refinery stocks	By receiving State and method of transportation						
					Intrastate			Interstate			
					Pipelines	Tank cars and trucks	Tankers and barges	Pipelines	Tank cars and trucks	Tankers and barges	
Delaware, Massachusetts, Rhode Island	55,376	141	----------	+87	----------	----------	----------	----------	----------	17,849	37,755
Florida, Georgia, South Carolina, Virginia	16,548	−2	109	−203	----------	----------	----------	----------	479	1,414	14,450
Maryland	6,067	−12	----------	+184	----------	----------	----------	----------	----------	1,098	5,141
New Jersey	146,052	138	----------	−221	----------	----------	----------	----------	----------	63,267	82,702
New York:											
East	7,714	8	----------	+68	----------	----------	----------	----------	----------	----------	7,790
West	19,293	----------	1,487	+54	----------	----------	----------	16,865	----------	----------	2,482
Pennsylvania:											
East	178,166	−4	----------	−21	----------	----------	----------	----------	----------	91,546	86,595
West	14,865	−7	5,975	+113	5,945	30	----------	7,832	140	1,024	----------
West Virginia	2,248	----------	2,500	−3	1,483	24	----------	328	410	----------	----------
Total, District 1	[1] 446,329	262	10,071	+58	7,428	54	----------	25,025	1,029	176,198	236,915
Illinois	205,375	16	86,061	−95	29,811	95	----------	173,760	----------	1,630	----------
Indiana	155,763	−8	4,781	−63	555	792	----------	153,743	602	----------	----------
Kansas	111,136	----------	129,909	−123	84,004	1,813	----------	24,967	229	----------	----------
Kentucky, Tennessee	41,193	2	20,242	+376	5,977	343	13,164	4,346	----------	17,741	----------
Michigan	47,973	33	19,076	−116	17,377	1,076	----------	23,815	----------	----------	[2] 5,622
Minnesota, Wisconsin	29,170	−6	----------	+370	----------	----------	----------	4,849	3,631	2,186	[3] 18,868
Missouri	20,405	----------	----------	−25	----------	----------	----------	20,380	----------	----------	----------
Nebraska	913	----------	16,888	−2	----------	----------	----------	907	4	----------	----------
North and South Dakota	15,576	−1	22,921	+3	14,980	598	----------	----------	----------	----------	----------
Ohio:											
East	35,855	----------	----------	+48	2,351	463	----------	33,089	----------		----------
West	94,472	17	4,903	+265	----------	25	----------	87,498	----------	----------	[3] 7,231
Oklahoma	130,276	13	187,746	−501	91,164	2,223	----------	36,401	----------	----------	----------
Total, District 2	888,107	66	492,527	+137	246,219	7,428	13,164	563,755	4,466	21,557	31,721

Alabama, Mississippi	12,311	−7	61,252	−15	6,387	1,775	1,372		318	1,476	961
Arkansas	27,559	4	36,555	+57	25,635	1,108		877			
Louisiana	256,623	221	388,345	−37	125,363	2,693	51,165	75,711	36	1,734	105
New Mexico	8,906	−4	109,345	+108	8,716	294					
Texas	798,914	403	950,529	+366	566,937	10,690	31,194	130,637	12	59,572	[4] 641
Total, District 3	1,104,313	617	1,546,026	+479	733,038	16,560	83,731	207,225	366	62,782	1,707
Colorado	13,234	3	41,994	+44	220	556		12,363	142		
Montana	23,887	29	26,857	−68	8,377	330		15,111			[5] 30
Utah	30,213	1	31,414	−65	5,494	127		24,282	246		
Wyoming	36,305	−12	148,885	−134	33,379	973			1,807		
Total, District 4	103,639	21	249,150	−223	47,470	1,986		51,756	2,195		30
California, Nevada, Alaska	390,115	651	307,549	−1,665	251,939	8,927	39,127	24,128		3,250	61,730
Washington, Oregon, Hawaii	54,655	15		−592						4,520	[6] 49,558
Total, District 5	444,770	666	307,549	−2,257	251,939	8,927	39,127	24,128		7,770	111,288
Total 1961	2,987,158	1,632	2,605,323	−1,806	1,286,094	34,955	136,022	871,889	8,056	268,307	[7] 381,661
Daily average	8,184	4	7,138	−5	3,523	96	373	2,388	22	736	1,046
Daily average, 1960	8,067	4	7,050	−8	3,528	93	344	2,342	28	715	1,013

---

[1] Includes 268,909 in Delaware River Valley.
[2] Pipeline.
[3] Includes pipeline 6,518; barges 713 (transhipped from PAD District III).
[4] Includes tank cars and trucks, 444; tankers and barges, 197.
[5] Tank cars and trucks.
[6] Includes pipeline, 33,131; tankers, 16,427.
[7] Excludes crude oil imported for direct fuel use.

TABLE 31.—Daily average total demand for crude petroleum in the United States, by State of origin and months

(Thousand barrels)

State	January	February	March	April	May	June	July	August	September	October	November	December	Year
1960:													
Alabama	16.0	24.8	14.5	14.8	25.8	19.6	18.1	19.4	30.0	21.5	15.7	24.5	20.4
Alaska	.9	.7	.7	----------	.2	.4	1.0	.6	1.0	.2	.6	5.3	1.0
Arkansas	82.1	92.2	81.1	78.9	89.5	80.9	88.1	88.4	78.4	77.9	85.6	72.9	83.0
California	851.8	789.9	851.0	859.4	841.9	816.6	900.6	866.1	842.1	806.5	858.6	860.9	845.8
Colorado	137.8	127.8	116.4	123.2	130.8	118.8	137.3	140.0	135.5	123.8	132.9	136.1	130.1
Florida	.2	.6	.6	4.1	.6	.7	.5	.4	.6	.5	.6	.6	.8
Illinois	222.8	206.9	217.8	189.2	190.2	215.3	214.4	239.2	227.9	223.1	209.4	225.6	215.2
Indiana	30.8	33.1	32.8	31.2	34.1	27.7	33.3	37.4	36.9	28.9	33.8	35.5	33.0
Kansas	323.5	306.9	309.8	264.9	316.5	312.5	328.2	345.5	312.1	290.0	308.5	310.4	310.9
Kentucky	67.1	68.8	57.6	65.2	63.1	58.4	58.6	66.5	60.8	56.2	50.5	54.5	60.6
Louisiana	1,062.3	1,064.2	1,081.3	1,115.3	1,063.7	1,101.8	1,120.7	1,070.4	1,061.5	1,129.3	1,086.9	1,111.4	1,089.1
Michigan	35.6	37.2	34.8	40.9	40.9	35.3	38.6	51.5	49.0	42.8	56.0	55.3	43.2
Mississippi	145.8	138.6	141.5	145.8	143.8	127.1	128.6	141.3	157.3	138.9	138.3	147.6	141.2
Montana	74.4	85.8	90.0	70.2	75.5	78.8	91.4	87.1	79.4	80.9	90.5	89.3	82.8
Nebraska	70.7	64.0	59.1	51.3	59.3	67.1	71.4	77.2	69.2	74.2	62.0	59.7	65.5
New Mexico	305.3	314.4	274.1	263.9	305.7	277.1	289.3	314.1	302.0	265.7	306.5	311.9	294.1
New York	4.8	5.1	5.2	5.4	5.1	5.3	4.9	4.9	5.0	4.6	4.8	4.6	5.0
North Dakota	60.2	52.4	49.0	60.5	63.3	58.7	57.3	66.2	58.4	61.3	61.3	66.3	59.6
Ohio	17.8	16.3	15.6	12.6	11.8	13.4	17.3	14.8	14.0	16.5	11.8	17.2	14.9
Oklahoma	559.3	560.3	507.8	540.0	476.4	548.9	534.4	556.4	548.5	501.7	518.1	522.3	530.9
Pennsylvania	23.7	13.9	18.9	17.6	17.4	17.3	13.9	14.0	19.2	16.9	15.9	18.0	17.3
Texas	2,815.4	2,667.2	2,542.4	2,616.0	2,574.7	2,587.7	2,572.6	2,501.2	2,477.7	2,453.9	2,456.7	2,491.1	2,562.8
Utah	116.1	110.2	94.7	112.7	93.5	108.9	101.4	100.4	96.5	90.1	92.2	107.0	101.9
West Virginia	6.2	5.3	6.6	5.8	6.7	5.7	6.2	6.6	6.2	6.6	9.0	4.6	6.3
Wyoming	354.1	314.8	355.2	341.7	296.7	395.5	428.0	407.9	392.6	374.0	364.6	365.7	366.1
Other States	.5	.7	1.4	1.8	1.6	.9	1.5	1.5	1.5	1.5	1.6	1.4	[1] 1.3
Total domestic crude	7,385.2	7,102.1	6,959.9	7,032.4	6,928.8	7,080.4	7,257.6	7,219.0	7,063.3	6,887.5	6,972.4	7,099.7	7,082.8
Foreign crude	926.8	997.8	987.6	959.3	1,062.5	1,083.0	1,077.6	1,057.4	1,067.8	1,051.8	942.0	966.7	1,015.1
Grand total 1960	8,312.0	8,099.9	7,947.5	7,991.7	7,991.3	8,163.4	8,335.2	8,276.4	8,131.1	7,939.3	7,914.4	8,066.4	8,097.9
Pennsylvania Grade (included above)	40.2	29.1	35.2	34.1	33.1	33.3	29.0	30.1	34.7	33.3	32.7	35.4	33.4
1961: [2]													
Alabama	26.7	13.8	19.7	23.0	15.4	6.6	21.4	17.8	15.5	15.6	28.9	17.5	18.5
Alaska	8.5	5.8	9.2	12.1	19.3	13.1	13.6	21.7	15.3	19.7	30.3	26.3	16.3
Arkansas	79.7	88.7	80.5	72.0	76.4	85.9	78.2	81.9	82.8	77.3	76.7	83.0	80.2
California	807.5	851.4	806.8	824.3	839.4	864.6	825.1	836.4	788.6	840.1	849.0	832.4	830.4
Colorado	123.0	141.6	143.9	115.2	130.9	114.4	144.9	123.9	131.6	115.5	139.3	128.3	129.3
Florida	.6	.5	3.7	.5	.6	1.6	3.6	.2	.5	.7	.8	.8	1.2
Illinois	204.6	206.9	226.4	187.6	178.8	215.9	218.0	236.7	250.5	226.6	225.2	225.0	216.9

Indiana	30.1	31.4	33.2	26.8	31.2	26.9	31.7	33.2	27.2	28.8	32.3	32.2	30.4
Kansas	325.1	301.2	294.5	299.9	300.0	303.9	328.2	342.6	319.1	264.5	316.7	325.9	310.2
Kentucky	45.2	58.5	53.2	46.9	42.2	48.6	53.8	55.3	49.9	55.4	45.8	50.7	50.4
Louisiana	1,198.4	1,172.8	1,121.3	1,071.7	1,181.1	1,189.9	1,149.2	1,190.2	1,071.0	1,196.3	1,219.5	1,201.3	1,163.7
Michigan	53.4	53.4	52.5	48.0	51.2	55.9	60.6	54.2	51.2	51.4	46.1	49.2	52.3
Mississippi	138.7	151.0	144.8	155.1	155.6	137.8	159.9	143.2	153.3	157.9	141.4	145.2	148.7
Montana	71.4	87.0	77.7	75.2	63.6	78.1	77.4	84.4	85.3	82.4	88.2	118.9	82.4
Nebraska	74.3	68.0	51.3	80.0	66.2	42.6	64.0	82.9	70.5	72.3	43.8	72.2	65.7
New Mexico	291.1	292.6	302.2	309.6	330.0	266.7	321.3	321.1	269.0	298.4	301.9	301.7	300.7
New York	4.3	4.4	4.8	5.5	4.7	4.0	3.8	4.1	4.6	4.6	5.2	5.5	4.6
North Dakota	68.0	61.0	71.6	55.1	37.6	71.3	64.9	69.4	65.2	69.9	72.4	67.7	64.5
Ohio	12.8	13.3	12.1	12.5	14.2	11.9	13.7	13.9	16.3	15.4	14.6	15.3	13.8
Oklahoma	549.8	536.6	540.8	511.6	516.9	520.6	498.2	562.3	531.4	504.8	492.4	515.4	523.5
Pennsylvania	19.2	11.3	16.6	14.9	10.8	11.3	10.9	8.2	13.1	18.2	12.6	19.5	13.9
Texas	2,701.8	2,719.9	2,591.5	2,532.4	2,442.0	2,442.4	2,544.2	2,573.2	2,398.2	2,571.7	2,529.3	2,600.9	2,553.4
Utah	109.3	101.9	82.6	90.7	93.8	89.4	86.4	88.9	89.1	77.1	106.6	84.5	91.7
West Virginia	6.4	7.4	6.6	5.7	6.0	7.9	5.2	8.4	5.5	6.6	9.8	9.3	7.0
Wyoming	399.3	427.7	382.7	324.4	442.8	396.2	404.6	412.7	378.1	387.4	350.9	407.1	392.9
Other States	1.2	1.7	1.7	1.7	1.5	1.5	1.8	1.6	1.5	1.7	1.6	1.4	[3] 1.6
Total domestic crude	7,350.4	7,409.8	7,131.9	6,902.4	7,052.2	7,009.0	7,184.6	7,368.4	6,884.3	7,160.3	7,181.3	7,337.2	7,164.2
Foreign crude	1,043.7	1,081.2	997.5	950.6	1,006.6	1,012.8	1,130.9	1,118.5	1,118.6	1,046.8	1,056.8	1,045.8	1,050.7
Grand total 1961	8,394.1	8,491.0	8,129.4	7,853.0	8,058.8	8,021.8	8,315.5	8,486.9	8,002.9	8,207.1	8,238.1	8,383.0	8,214.9
Pennsylvania Grade (included above)	33.4	28.6	32.3	30.1	26.8	27.9	34.6	27.0	18.2	34.6	33.9	50.7	31.6

---

[1] Arizona, 0.2; Missouri, 0.2; Nevada, 0.1; South Dakota, 0.7; Tennessee, 0.1; Virginia and Washington were less than 0.05.

[2] Preliminary figures.

[3] Arizona, 0.2; Missouri, 0.3; Nevada, 0.4; South Dakota, 0.6; Tennessee, 0.1; and Virginia was less than 0.05.

TABLE 32.—Total demand for crude petroleum in the United States, by States of origin and months

(Thousand barrels)

State	January	February	March	April	May	June	July	August	September	October	November	December	Year
1960													
Alabama	495	718	450	443	800	587	562	603	900	667	472	761	7, 458
Alaska	27	21	23	1	7	11	30	19	32	7	18	165	361
Arkansas	2, 545	2, 674	2, 514	2, 364	2, 773	2, 426	2, 731	2, 743	2, 353	2, 414	2, 569	2, 260	30, 366
California	26, 407	22, 906	26, 380	25, 782	26, 100	24, 497	27, 919	26, 849	25, 262	25, 001	25, 757	26, 690	309, 550
Colorado	4, 271	3, 705	3, 609	3, 695	4, 056	3, 565	4, 255	4, 340	4, 065	3, 837	3, 987	4, 217	47, 602
Florida	6	17	18	124	18	21	17	11	18	17	17	20	304
Illinois	6, 908	6, 000	6, 751	5, 677	5, 895	6, 460	6, 645	7, 415	6, 836	6, 917	6, 281	6, 994	78, 779
Indiana	954	959	1, 018	937	1, 056	831	1, 033	1, 159	1, 107	896	1, 014	1, 101	12, 065
Kansas	10, 030	8, 901	9, 605	7, 946	9, 811	9, 374	10, 174	10, 709	9, 364	8, 990	9, 256	9, 623	113, 783
Kentucky	2, 080	1, 996	1, 787	1, 957	1, 955	1, 753	1, 818	2, 063	1, 823	1, 741	1, 516	1, 688	22, 177
Louisiana	32, 932	30, 861	33, 519	33, 459	32, 976	33, 053	34, 743	33, 183	31, 845	35, 008	32, 603	34, 433	398, 615
Michigan	1, 105	1, 079	1, 078	1, 228	1, 269	1, 060	1, 196	1, 596	1, 470	1, 328	1, 680	1, 713	15, 802
Mississippi	4, 519	4, 019	4, 385	4, 374	4, 459	3, 813	3, 988	4, 380	4, 719	4, 305	4, 150	4, 576	51, 687
Montana	2, 307	2, 487	2, 789	2, 107	2, 340	2, 364	2, 834	2, 700	2, 381	2, 507	2, 716	2, 767	30, 299
Nebraska	2, 191	1, 856	1, 832	1, 540	1, 837	2, 013	2, 212	2, 393	2, 076	2, 299	1, 861	1, 852	23, 962
New Mexico	9, 464	9, 117	8, 498	7, 916	9, 476	8, 312	8, 967	9, 736	9, 060	8, 237	9, 194	9, 670	107, 647
New York	148	147	157	161	158	159	152	152	151	144	144	144	1, 817
North Dakota	1, 865	1, 520	1, 518	1, 814	1, 961	1, 761	1, 775	2, 052	1, 752	1, 899	1, 840	2, 056	21, 813
Ohio	552	472	484	379	367	401	537	460	420	512	353	534	5, 471
Oklahoma	17, 338	16, 249	15, 743	16, 200	14, 768	16, 468	16, 566	17, 249	16, 454	15, 552	15, 542	16, 191	194, 320
Pennsylvania	736	402	586	529	539	520	430	434	577	525	478	559	6, 315
Texas	87, 277	77, 349	78, 815	78, 480	79, 815	77, 631	79, 750	77, 536	74, 332	76, 070	73, 702	77, 241	937, 998
Utah	3, 600	3, 197	2, 937	3, 382	2, 901	3, 267	3, 143	3, 111	2, 895	2, 794	2, 767	3, 316	37, 310
West Virginia	192	155	206	173	208	171	195	206	185	206	271	142	2, 310
Wyoming	10, 977	9, 130	11, 012	10, 252	9, 198	11, 865	13, 269	12, 645	11, 778	11, 595	10, 939	11, 337	133, 997
Other States	16	20	43	55	51	28	46	45	45	46	44	42	[1] 481
Total domestic crude	228, 942	205, 957	215, 757	210, 975	214, 794	212, 411	224, 987	223, 789	211, 900	213, 514	209, 171	220, 092	2, 592, 289
Foreign crude	28, 731	28, 937	30, 617	28, 779	32, 939	32, 491	33, 405	32, 778	32, 035	32, 607	28, 263	29, 966	371, 548
Grand total 1960	257, 673	234, 894	246, 374	239, 754	247, 733	244, 902	258, 392	256, 567	243, 935	246, 121	237, 434	250, 058	2, 963, 837
Daily average:													
Domestic crude	7, 385	7, 102	6, 960	7, 032	6, 929	7, 080	7, 258	7, 219	7, 063	6, 887	6, 972	7, 100	7, 083
Domestic and foreign crude	8, 312	8, 100	7, 948	7, 992	7, 991	8, 163	8, 334	8, 276	8, 131	7, 939	7, 914	8, 066	8, 098
Pennsylvania Grade (included above)	1, 247	845	1, 091	1, 023	1, 025	998	899	932	1, 041	1, 032	981	1, 098	12, 212
1961 [2]													
Alabama	829	387	612	691	476	199	663	552	465	484	867	542	6, 767
Alaska	265	162	284	364	598	393	422	673	458	612	910	816	5, 957
Arkansas	2, 471	2, 484	2, 495	2, 161	2, 367	2, 577	2, 425	2, 541	2, 485	2, 396	2, 301	2, 574	29, 277
California	25, 031	23, 838	25, 010	24, 729	26, 020	25, 937	25, 579	25, 929	23, 659	26, 044	25, 471	25, 804	303, 051

Colorado	3, 812	3, 964	4, 461	3, 456	4, 059	3, 433	4, 491	3, 841	3, 947	3, 579	4, 179	3, 978	47, 200
Florida	18	15	115	14	18	47	113	6	15	22	24	25	432
Illinois	6, 344	5, 794	7, 019	5, 627	5, 542	6, 476	6, 759	7, 339	7, 514	7, 025	6, 755	6, 975	79, 169
Indiana	934	880	1, 030	803	967	806	983	1, 028	817	893	969	999	11, 109
Kansas	10, 078	8, 433	9, 128	8, 997	9, 301	9, 116	10, 175	10, 623	9, 573	8, 198	9, 501	10, 104	113, 227
Kentucky	1, 400	1, 639	1, 649	1, 407	1, 309	1, 458	1, 668	1, 713	1, 496	1, 717	1, 374	1, 572	18, 402
Louisiana	37, 151	32, 837	34, 759	32, 150	36, 613	35, 694	35, 623	36, 896	32, 130	37, 087	36, 586	37, 240	424, 766
Michigan	1, 655	1, 495	1, 628	1, 440	1, 588	1, 679	1, 879	1, 679	1, 536	1, 594	1, 383	1, 526	19, 082
Mississippi	4, 299	4, 229	4, 490	4, 654	4, 824	4, 135	4, 958	4, 438	4, 599	4, 895	4, 242	4, 502	54, 265
Montana	2, 214	2, 435	2, 408	2, 256	1, 973	2, 339	2, 398	2, 617	2, 560	2, 553	2, 647	3, 685	30, 085
Nebraska	2, 302	1, 905	1, 590	2, 401	2, 051	1, 279	1, 985	2, 569	2, 114	2, 240	1, 315	2, 237	23, 988
New Mexico	9, 023	8, 194	9, 369	9, 288	10, 232	8, 001	9, 960	9, 950	8, 069	9, 250	9, 059	9, 352	109, 747
New York	133	124	149	166	147	122	117	128	135	144	156	171	1, 692
North Dakota	2, 108	1, 708	2, 220	1, 652	1, 166	2, 138	2, 011	2, 150	1, 955	2, 166	2, 173	2, 098	23, 545
Ohio	396	372	374	376	439	356	424	432	488	476	438	474	5, 045
Oklahoma	17, 046	15, 024	16, 765	15, 348	16, 021	15, 618	15, 445	17, 430	15, 945	15, 651	14, 771	15, 976	191, 040
Pennsylvania	594	316	515	448	336	339	338	254	394	563	379	606	5, 082
Texas	83, 755	76, 156	80, 336	75, 970	75, 704	73, 273	78, 870	79, 769	71, 947	79, 722	75, 878	80, 627	932, 007
Utah	3, 388	2, 854	2, 560	2, 722	2, 908	2, 683	2, 678	2, 757	2, 674	2, 390	3, 197	2, 619	33, 430
West Virginia	198	206	203	170	182	237	161	261	165	204	291	287	2, 565
Wyoming	12, 379	11, 975	11, 864	9, 731	13, 727	11, 887	12, 546	12, 793	11, 342	12, 013	10, 526	12, 621	143, 404
Other States	39	49	56	50	51	49	51	51	47	50	48	44	[3] 585
Total domestic crude	227, 862	207, 475	221, 089	207, 071	218, 619	210, 271	222, 722	228, 419	206, 529	221, 968	215, 440	227, 454	2, 614, 919
Foreign crude	32, 354	30, 273	30, 925	28, 520	31, 205	30, 383	35, 055	34, 675	33, 559	32, 452	31, 703	32, 419	383, 523
Grand total 1961	260, 216	237, 748	252, 014	235, 591	249, 824	240, 654	257, 777	263, 094	240, 088	254, 420	247, 143	259, 873	2, 998, 442
Daily average:													
Domestic crude	7, 350	7, 410	7, 132	6, 902	7, 052	7, 009	7, 185	7, 368	6, 884	7, 160	7, 181	7, 337	7, 164
Domestic and foreign crude	8, 394	8, 491	8, 129	7, 853	8, 059	8, 022	8, 315	8, 487	8, 003	8, 207	8, 238	8, 383	8, 215
Pennsylvania Grade (included above)	1, 036	802	1, 000	904	831	839	1, 074	838	546	1, 074	1, 016	1, 572	11, 532

---

[1] Arizona, 73; Missouri, 75; Nevada, 27; South Dakota, 283; Tennessee, 20; Virginia, 2; and Washington 1.

[2] Preliminary figures.

[3] Arizona, 67; Missouri, 108; Nevada, 152; South Dakota, 234; Tennessee, 18; and Virginia, 6.

STOCKS

Stocks of all oils increased 40.5 million barrels in 1961. Refined product stocks rose 27.5 million barrels; stocks of natural-gas liquids, 8.1 million barrels; and crude-oil stocks, 4.9 million.

Because demand was poor and crude runs were high, the reduction in stocks of refined products during the first quarter of 1961 averaged only 237,000 barrels daily, while for the same period in 1960 the reduction was 671,000 barrels daily. Stocks of refined products as of March 31, 1961, totaled 494.5 million barrels, 28.6 million more than a year ago.

The situation improved during the second and third quarter, but high runs and poor demand in the fourth quarter again caused the stocks to soar upward.

While the production of natural-gas liquids increased 5.9 percent in 1961, the increase in demand was only 3.9 percent, which resulted in an 8.1 million barrel addition to stocks.

TABLE 33.—Stocks of crude petroleum, natural-gas liquids, and refined products in the United States at end of year

(Thousand barrels)

	1957	1958 [1]	1959 [2]	1960 [2]	1961 [2]
Crude petroleum:					
At refineries	76, 576	69, 568	69, 305	66, 450	64, 644
Pipeline and tank farm	183, 526	172, 458	167, 147	152, 848	159, 105
Producers	21, 711	20, 716	20, 677	20, 502	20, 915
Total crude petroleum	281, 813	262, 742	257, 129	239, 800	244, 664
Natural-gas liquids	20, 156	22, 752	24, 887	28. 931	37, 067
Refined products	537, 937	504, 044	526, 954	[3] 515, 827	543, 343
Grand total	839, 906	789, 538	808, 970	[3] 784, 558	825, 074

[1] Includes Alaska.

[2] Includes Alaska and Hawaii.

[3] New basis to include pipeline stocks of jet fuel and bulk terminal stocks of lubricants, asphalt, and miscellaneous oils, December 31, 1960, stocks on an old basis for comparison with previous years; jet fuel, 6,456,000 barrels; lubricants, 9,874,000 barrels; asphalt, 10,142,000 barrels; and miscellaneous oils, 2,715,000 barrels.

TABLE 34.—Stocks of crude petroleum in the United States by State of origin, by month: 1961

(Thousand barrels)

State of origin	Jan. 1	Jan. 31	Feb. 28	Mar. 31	Apr. 30	May 31	June 30	July 31	Aug. 31	Sept. 30	Oct. 31	Nov. 30	Dec. 31
Alabama	393	183	358	371	301	468	773	552	565	649	748	467	558
Alaska	210	137	218	254	269	125	264	421	412	609	712	597	578
Arkansas	1, 786	1, 854	1. 798	1, 937	2, 276	2, 348	2, 100	2, 069	1, 933	1, 783	1, 785	1, 891	1, 758
California	24, 715	25, 263	24, 642	25, 401	25, 525	25, 112	23, 796	23, 540	22, 889	23, 785	23, 185	22, 246	21, 726
Colorado	3, 109	3, 372	3, 097	2, 742	3, 205	3, 134	3, 391	2, 852	2, 868	2, 820	3, 200	2, 806	2, 655
Florida	145	160	176	93	109	121	103	16	45	61	68	69	84
Illinois	6, 388	6, 608	6, 941	6, 623	7, 432	8, 517	8, 680	8, 567	8, 159	7, 148	7, 067	6, 939	6, 606
Indiana	317	339	321	325	394	412	477	410	338	408	468	428	360
Kansas	9, 398	8, 940	9, 394	9, 963	10, 242	10, 479	10, 600	9, 712	8, 715	8, 279	9, 632	9, 363	8, 412
Kentucky	1, 026	1, 166	987	1, 037	1, 130	1, 415	1, 509	1, 431	1, 349	1, 368	1, 227	1, 343	1, 267
Louisiana	19, 564	18, 090	17, 186	17, 822	20, 959	20, 836	20, 667	20, 427	19, 044	20, 373	19, 975	19, 288	19, 760
Michigan	1, 259	1, 271	1, 299	1, 338	1, 495	1, 570	1, 526	1, 188	1, 065	1, 026	989	1, 091	1, 075
Mississippi	2, 346	2, 657	2, 572	2, 727	2, 569	2, 389	2, 579	2, 235	2, 430	2, 312	2, 048	2, 382	2, 573
Montana	3, 194	3, 565	3, 460	3, 577	3, 786	4, 409	4, 552	4, 699	4, 835	4, 915	5, 056	5, 037	4, 016
Nebraska	1, 826	1, 522	1, 686	2, 285	2, 017	2, 009	2, 750	2, 664	2, 018	1, 792	1, 772	2, 329	2, 234
New Mexico	8, 091	8, 276	8, 672	8, 879	9, 086	8, 554	9, 834	9, 232	8, 919	10, 088	10, 418	10, 552	10, 427
New York	39	41	43	41	41	44	66	86	103	101	100	79	62
North Dakota	1, 285	1, 166	1, 358	1, 102	1, 201	1, 468	1, 118	1, 174	1, 157	1, 280	1, 215	1, 156	1, 308
Ohio	578	589	594	653	665	669	743	761	812	761	744	749	694
Oklahoma	17, 006	16, 691	16, 920	17, 140	18, 177	18, 545	18, 100	18, 114	16, 683	16, 150	16, 553	17, 028	17, 800
Pennsylvania	912	783	897	890	871	1, 053	1, 205	1, 336	1, 585	1, 647	1, 559	1, 634	1, 452
South Dakota	3	6	3	3	3	3	3	3	3	3	3	3	3
Texas	100, 613	97, 236	94, 573	101, 248	105, 694	108, 031	110, 075	107, 707	106, 071	107, 923	105, 711	105, 479	106, 623
Utah	3, 432	3, 436	3, 340	3, 640	3, 511	3, 225	3, 357	3, 193	2, 981	2, 977	3, 426	2, 982	3, 120
West Virginia	643	637	620	629	656	701	690	749	727	794	852	829	781
Wyoming	17, 514	17, 439	17, 071	18, 013	19, 894	18, 805	18, 297	17, 094	16, 325	16, 298	15, 811	16, 683	16, 699
Total domestic crude	225, 792	221, 427	218, 226	228, 733	241, 508	244, 442	247, 255	240, 232	232, 031	235, 350	234, 324	233. 450	232, 631
Foreign [1]	14, 008	15, 342	13, 837	16, 188	14, 637	16, 998	13, 801	16, 721	16, 094	15, 682	16, 815	15, 231	12, 033
Total stocks	239, 800	236, 769	232, 063	244, 921	256, 145	261, 440	261, 056	256, 953	248, 125	251, 032	251, 139	248, 681	244, 664
Pennsylvania Grade (includes above)	1, 815	1, 706	1, 781	1, 802	1, 831	2, 061	2, 248	2, 171	2, 415	2, 871	2, 858	2, 880	2, 295

[1] Includes foreign crude petroleum held in PAD district V: December 1960, 4,881,000; January, 5,740,000; February, 4,044,000; March, 5,163,000; April, 5,095,000; May, 4,780,000; June, 2,954,000; July, 4,958,000; August, 4,928,000; September, 4,555,000; October, 4,591,000; November, 5,061,000; December, 3,640,000 barrels.

TABLE 35.—Stocks of crude petroleum in the United States by location, by month: 1961

(Thousand barrels)

State	Jan. 1	Jan. 31	Feb. 28	Mar. 31	Apr. 30	May 31	June 30	July 31	Aug. 31	Sept. 30	Oct. 31	Nov. 30	Dec. 31
Alabama	226	254	310	444	347	333	459	380	311	274	246	215	189
Alaska	93	137	63	143	130	105	206	226	279	208	293	299	396
Arizona	450	451	452	450	450	450	450	450	453	455	450	451	447
Arkansas	1,560	1,733	1,768	1,835	2,168	2,097	1,900	1,804	1,715	1,802	1,641	1,661	1,635
California, Oregon, Washington	29,244	30,627	29,031	30,581	30,660	29,984	27,183	29,196	28,249	29,200	28,657	28,065	25,559
Colorado	1,517	1,553	1,455	1,474	1,707	1,715	1,941	1,808	1,367	1,419	1,413	1,581	1,401
Florida, Georgia, South Carolina, Virginia	854	913	957	943	920	912	664	621	886	1,164	691	815	696
Hawaii	950	947	495	997	972	637	457	395	542	310	714	431	710
Illinois	14,416	14,089	14,334	14,493	15,784	16,649	17,171	16,653	15,757	15,076	14,171	14,523	13,810
Indiana	4,325	4,586	4,366	4,205	4,381	4,843	5,079	4,692	4,280	4,144	4,272	4,536	4,038
Iowa, Missouri	6,372	6,480	6,439	6,611	7,203	6,718	6,748	6,539	6,710	6,638	6,699	6,689	6,100
Kansas	11,193	10,726	10,174	10,851	12,067	12,355	12,098	11,475	10,781	10,221	11,711	10,775	10,186
Kentucky, Tennessee	2,914	2,840	3,104	3,408	3,789	3,870	3,720	3,629	3,516	3,290	3,652	3,245	3,404
Louisiana	14,816	13,387	13,679	13,673	14,873	15,055	15,566	13,614	14,010	14,920	14,188	14,321	14,650
Maryland	314	551	736	801	569	557	624	564	645	397	517	453	498
Massachusetts, Delaware, Rhode Island	1,404	1,401	1,064	1,730	1,542	1,968	1,825	1,230	1,753	1,539	1,558	1,301	1,491
Michigan	2,169	2,039	2,183	2,249	2,528	2,351	2,557	2,345	2,251	2,189	2,089	1,736	1,988
Minnesota, Wisconsin	1,275	1,191	1,212	1,373	1,510	1,810	1,715	1,745	1,833	1,909	1,979	1,937	1,744
Mississippi	1,755	1,917	1,725	1,760	1,823	1,755	1,871	1,826	1,853	1,632	1,935	1,804	1,841
Montana	1,985	2,148	2,178	2,114	2,107	2,563	2,623	2,616	2,703	2,688	2,903	2,858	2,622
Nebraska	1,674	1,657	1,716	1,698	1,910	1,830	1,831	1,843	1,644	1,634	1,744	1,756	1,860
New Jersey	5,816	5,863	5,529	6,597	6,755	6,777	5,599	5,651	5,545	5,276	5,292	6,010	5,692
New Mexico	3,619	3,646	3,702	3,620	3,427	3,423	3,536	3,474	3,375	3,499	3,415	3,451	3,608
New York	714	559	693	639	667	948	813	757	724	869	857	905	906
North Dakota	930	807	836	833	746	1,015	766	765	831	922	826	824	829
Ohio	5,977	6,316	6,302	6,377	7,012	6,861	7,227	7,372	6,811	6,242	5,893	6,374	6,088
Oklahoma	18,518	16,405	15,838	17,416	17,947	18,229	18,631	18,719	18,612	19,521	20,499	20,589	20,398
Pennsylvania	7,990	7,843	7,929	9,215	7,228	9,786	9,986	11,191	10,558	10,791	11,572	10,369	8,904
South Dakota	3	3	3	3	3	3	3	3	3	3	3	3	3
Texas	85,364	84,393	82,520	86,908	92,563	93,815	96,289	94,711	90,208	92,947	90,927	90,027	92,469
Utah	1,044	1,025	1,096	1,011	1,062	987	910	957	918	932	979	859	920
West Virginia	630	593	610	632	624	656	626	685	698	754	736	750	704
Wyoming	9,689	9,689	9,564	9,837	10,671	10,383	9,982	9,017	8,304	8,167	8,617	9,068	8,878
Total	239,800	236,769	232,063	244,921	256,145	261,440	261,056	256,953	248,125	251,032	251,139	248,681	244,664

TABLE 36.—Stocks of crude petroleum in the United States by classification and location, by month: 1961

(Thousand barrels)

Classification and location	Jan. 1	Jan. 31	Feb. 28	Mar. 31	Apr. 30	May 31	June 30	July 31	Aug. 31	Sept. 30	Oct. 31	Nov. 30	Dec. 31
At refineries:													
Alabama	196	219	262	365	295	234	372	319	264	230	220	178	111
Arkansas	390	409	445	422	592	565	489	491	508	496	453	424	447
California, Oregon, Washington	13,603	14,765	13,487	15,097	15,252	15,199	12,557	14,234	14,081	14,157	13,516	13,946	11,586
Colorado	186	207	217	218	341	260	283	300	230	271	200	269	230
Florida, Georgia, South Carolina, Virginia	815	857	885	850	811	791	643	605	841	1,103	623	746	612
Hawaii	950	947	495	997	972	637	457	395	542	310	714	431	710
Illinois	3,215	3,357	3,260	3,208	3,423	3,612	4,221	4,154	3,520	3,426	3,132	3,193	3,120
Indiana	1,687	1,893	1,660	1,494	1,661	1,893	1,971	1,621	1,478	1,607	1,671	1,786	1,624
Kansas	1,585	1,528	1,473	1,392	1,830	1,955	1,759	1,618	1,610	1,374	1,633	1,557	1,462
Kentucky, Tennessee	1,340	1,417	1,532	1,881	2,027	1,651	1,628	1,713	1,671	1,503	1,878	1,544	1,716
Louisiana	4,976	4,168	4,439	4,560	4,648	4,704	5,075	4,121	4,509	5,224	4,874	4,524	4,939
Maryland	314	551	736	801	569	557	624	564	645	397	517	453	498
Massachusetts, Delaware, Rhode Island	1,404	1,401	1,064	1,730	1,542	1,968	1,825	1,230	1,753	1,539	1,558	1,301	1,491
Michigan	996	965	863	867	1,084	1,076	1,085	1,085	848	816	893	810	880
Minnesota, Wisconsin	777	698	688	746	998	1,255	1,174	1,152	1,242	1,278	1,394	1,403	1,147
Mississippi	156	139	155	147	154	153	195	180	211	197	225	226	226
Missouri	244	222	238	248	241	219	250	227	272	214	258	254	219
Montana	653	635	723	637	537	656	691	692	736	686	748	704	585
Nebraska	51	52	63	64	66	64	61	52	50	47	44	32	49
New Jersey	5,549	5,466	5,368	6,352	6,513	6,547	5,599	5,651	5,545	5,036	5,292	5,776	5,328
New Mexico	152	223	213	232	241	255	249	208	217	232	218	200	260
New York	509	417	568	507	537	753	635	469	453	519	529	611	631
North Dakota	340	295	318	278	199	380	176	223	253	355	273	319	343
Ohio	1,250	1,763	1,732	1,835	1,828	1,772	1,763	1,778	1,694	1,603	1,561	1,666	1,563
Oklahoma	2,522	2,336	2,467	2,691	2,333	2,391	2,516	2,079	1,904	2,071	2,306	2,048	2,021
Pennsylvania	6,886	6,815	6,830	8,134	6,072	8,470	8,463	9,507	8,692	8,845	9,641	8,298	6,978
Texas	14,646	14,299	14,203	15,508	17,104	16,471	15,720	15,859	15,339	16,225	15,311	15,230	15,012
Utah	413	422	446	485	395	382	313	367	348	313	397	310	348
West Virginia	43	35	35	64	48	50	58	53	46	53	55	56	40
Wyoming	602	630	757	783	928	806	769	730	706	538	581	486	468
Total at refineries	66,450	67,131	65,622	72,593	73,241	75,726	71,621	71,677	70,208	70,665	70,715	68,781	64,644

TABLE 36.—Stocks of crude petroleum in the United States by classification and location, by month: 1961—Continued

Classification and location	Jan. 1	Jan. 31	Feb. 28	Mar. 31	Apr. 30	May 31	June 30	July 31	Aug. 31	Sept. 30	Oct. 31	Nov. 30	Dec. 31
Pipeline and tank-farm stocks:													
Alabama	18	21	35	65	38	83	70	48	34	32	14	25	62
Alaska	91	135	60	140	126	102	204	223	276	205	291	296	390
Arkansas	845	989	993	1,098	1,226	1,207	1,081	988	887	978	870	919	865
California, Arizona	11,830	11,901	11,566	11,491	11,578	11,082	10,945	10,991	10,203	11,162	10,961	10,107	9,966
Colorado	1,216	1,231	1,123	1,141	1,251	1,340	1,543	1,373	1,012	1,023	1,103	1,202	1,061
Florida, New Jersey	293	441	222	327	340	342	14	16	36	292	60	297	439
Illinois	10,672	10,188	10,550	10,751	11,797	12,493	12,431	11,955	11,723	11,126	10,510	10,816	10,151
Indiana	2,578	2,633	2,646	2,651	2,660	2,895	3,053	3,016	2,742	2,482	2,546	2,690	2,354
Iowa, Missouri	6,128	6,258	6,201	6,363	6,962	6,499	6,498	6,312	6,438	6,424	6,441	6,435	5,881
Kansas	8,977	8,581	8,109	8,845	9,614	9,794	9,746	9,245	8,594	8,262	9,489	8,645	8,120
Kentucky, Tennessee	1,514	1,363	1,512	1,472	1,702	2,159	2,032	1,856	1,790	1,732	1,719	1,646	1,628
Louisiana	7,697	7,116	7,202	7,020	8,127	8,238	8,368	7,355	7,533	7,664	7,392	7,910	7,724
Michigan	988	889	1,130	1,192	1,249	1,090	1,292	1,075	1,228	1,198	1,026	751	938
Minnesota	498	493	524	627	512	555	541	593	591	631	585	534	597
Mississippi	1,194	1,338	1,135	1,168	1,219	1,167	1,216	1,201	1,207	1,015	1,290	1,223	1,175
Montana	987	1,173	1,125	1,142	1,225	1,562	1,592	1,584	1,632	1,672	1,820	1,824	1,692
Nebraska	1,508	1,490	1,523	1,509	1,719	1,641	1,640	1,651	1,459	1,447	1,580	1,604	1,686
New Mexico	2,280	2,186	2,292	2,236	2,009	2,006	2,065	2,084	2,016	2,130	2,055	2,099	2,211
New York	175	112	95	102	100	165	148	258	241	320	298	264	245
North Dakota	326	249	265	282	260	326	311	267	313	300	311	259	252
Ohio	4,647	4,473	4,490	4,462	5,104	5,009	5,384	5,514	5,037	4,559	4,252	4,628	4,445
Oklahoma	14,549	12,587	11,909	13,228	14,087	14,321	14,633	15,168	15,241	15,988	16,741	17,144	16,990
Pennsylvania	954	878	949	931	1,006	1,166	1,373	1,534	1,716	1,796	1,781	1,921	1,776
Texas	63,399	62,610	61,878	63,851	67,760	69,940	72,930	71,218	67,695	69,498	68,732	67,013	69,573
Utah	595	564	612	492	601	546	537	523	508	568	533	507	525
West Virginia	422	393	410	403	411	441	403	467	487	536	516	529	499
Wyoming	8,467	8,479	8,207	8,454	9,148	8,982	8,648	7,687	7,018	6,999	7,386	8,037	7,860
Total pipeline and tank-farm stocks	152,848	148,771	146,763	151,443	161,831	165,151	168,698	164,202	157,657	160,039	160,302	159,325	159,105
Lease stocks	20,502	20,867	20,678	20,885	21,073	20,563	20,737	21,074	20,260	20,328	20,122	20,575	20,915
Total stocks: 1961	239,800	236,769	233,063	244,921	256,145	261,440	261,056	256,953	248,125	251,032	251,139	248,681	244,664
1960	257,129	252,206	257,028	260,923	266,178	261,312	257,301	242,745	234,091	231,966	232,990	239,528	239,800

VALUES AND PRICE

The average value of crude oil at the wells in 1961 was $2.89 per barrel, and the total value of crude oil at the wells was $7,567 million. These figures compare with an average per barrel value of $2.88 and a total value of $7,420 million in 1960.

The posted prices for crude oil at the well in 1961 showed few changes from the December 31, 1960, postings. Prices quoted for East Texas crudes were cut 15 cents per barrel in September, and the posted price for Pennsylvania-grade crude oils declined 17 cents per barrel in December.

TABLE 37.—**Value of crude petroleum at wells in the United States, by States**

State	1960		1961 [1]	
	Total value at wells (thousand dollars)	Average value per barrel	Total value at wells (thousand dollars)	Average value per barrel
Alabama	21,254	$2.90	19,063	$2.75
Alaska	1,230	2.20	17,647	2.79
Arkansas	83,424	2.77	80,435	2.75
California	751.166	2.46	729,151	2.43
Colorado	137,660	2.90	134,628	2.88
Illinois	228,929	2.96	237,367	2.99
Indiana	35,439	2.94	33,233	2.98
Kansas	329,014	2.90	324,376	2.89
Kentucky	60,268	2.85	55,370	2.97
Louisiana:				
Gulf Coast	1,109,629	3.14	1,191,898	3.15
Northern	148,509	3.13	148,007	3.14
Total Louisiana	1,258,138	3.14	1,339,905	3.15
Michigan	46,266	2.91	55,182	2.92
Mississippi	146,235	2.83	153,667	2.82
Montana	72,878	2.41	74,795	2.42
Nebraska	68,378	2.87	69,529	2.85
New Mexico:				
Southeastern	261,336	2.87	278,605	2.89
Northwestern	44,559	2.73	42,179	2.69
Total New Mexico	305,895	2.85	320,784	2.86
New York	8,412	4.64	8,163	4.76
North Dakota	59,598	2.71	64,105	2.72
Ohio	16,053	2.97	15,947	3.09
Oklahoma	563,306	2.92	558,237	2.91
Pennsylvania	27,341	4.55	26,480	4.71
Texas: [2]				
Gulf Coast	543,299	3.25	551,660	3.26
East Texas proper	153,901	3.16	153,036	3.15
West Texas	1,192,506	2.85	1,222,550	2.86
Other districts	859,029	2.93	860,679	2.94
Total Texas	2,748,735	2.96	2,787,925	2.97
Utah	103,008	2.74	91,075	2.75
West Virginia	9,361	4.07	11,190	4.14
Wyoming	336,114	2.51	356,473	2.50
Other States [3]	2,079	2.45	2,218	2.32
Total United States	7,420,181	2.88	7,566,945	2.89

[1] Preliminary figures.
[2] Texas Railroad Commission divisions.
[3] Arizona, Florida, Missouri, Nevada, South Dakota, Tennessee, Virginia, and Washington.

TABLE 38.—Posted price per barrel of petroleum at wells in the United States in 1961, by grade, with date of change [1]

Date	Pennsylvania Grade		Corning Grade	Western Kentucky	Indiana-Illinois	Cold-water, Mich.	Oklahoma-Kansas	
	Bradford and Allegheny districts	In southwest Pennsylvania					34°-34.9°	36°-36.9°
Jan. 1	$4.80	$4.25	$2.77	$3.00	$3.00	$2.95	$2.91	$2.97
Dec. 13	4.63	4.08	----------	----------	----------	----------	----------	----------

Date	Panhandle Texas (Carson, Gray, Hutchinson, and Wheeler Counties) 35°-35.9°	West Texas 30°-30.9° (sweet)	Lea County, N. Mex. 30°-30.9° (sour)	South Texas, Mirando 24°-24.9°	East Texas	Gulf Coast			
						Conroe, Tex.	Texas		Louisiana
							30°-30.9°	20°-20.9°	30°-30.9°
Jan. 1	$2.80	$2.81	$2.65	$3.23	$3.25	$3.53	$3.20	$3.00	$3.10
Sept. 1	----------	----------	----------	----------	3.10	--------	--------	--------	--------

Date	Rodessa, 36°-36.9°	Smackover, Ark.	Elk Basin, Wyo. 30°-30.9°	California			
				Coalinga 32°-32.9°	Kettleman Hills 37°-37.9°	Midway Sunset 19°-19.9°	Wilmington 24°-24.9°
Jan. 1	$3.07	$2.68	$2.63	$2.96	$3.21	$2.19	$2.58

---

[1] Source: Platt's Oil Price Handbook.

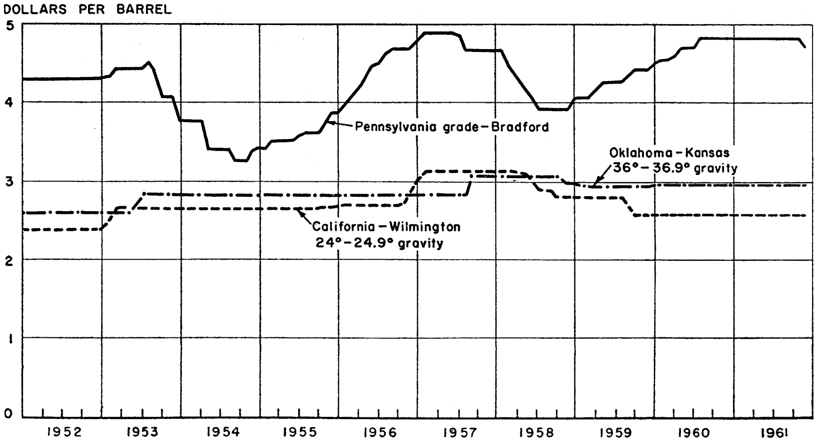

FIGURE 4.—Posted prices of selected grades of crude petroleum in the United States, 1952–61, by months.

REFINED PRODUCTS

GENERAL REVIEW

Petroleum is consumed in many finished products that must be considered individually. Competition with other fuels and economic and climatic conditions influence the consumption of these products.

Gasoline is consumed principally in highway transport, aviation, and mechanized farming. The demand for kerosine (a product defined as meeting lamp-oil specifications for color and flashpoint) has changed drastically within the past few years. This product was losing sales to electricity and liquefied petroleum, especially in rural areas, but the ability of the commercial jet aircraft to use straight kerosine as fuel has opened a vast new market. Distillate fuel oil, including light diesel oils, was used for space heating and for diesel locomotive fuel and nearly replaced residual fuel oil and coal in railroad use. Residual fuel oil usually sells for less than crude oil at the refineries and competes directly with natural gas and coal for heavy-fuel uses. As it cannot be moved by pipeline, its distribution depends on cheap water transport and limited tank car movement. Therefore, it cannot normally compete with coal in coal-producing areas. Liquefied gases, in competition with kerosine and light distillate fuel oil in domestic use, were gaining in importance as fuel in internal combustion engines and as the initial raw material in synthesizing many petrochemicals. Jet fuels (a blend of gasoline, kerosine, and distillate fuel oils) have replaced gasoline in military combat aircraft.

Total demand for all oils in 1961 averaged 9,945,000 barrels daily, a gain of less than 1 percent for the year. Domestic demand increased 1.1 percent, but exports declined 13.9 percent.

Lubricating oil and grease, almost 27 percent of the total, were the principal petroleum products exported in 1961. Total exports in 1961 averaged 174,000 barrels daily.

Domestic demand averaged 9,771,000 barrels daily in 1961 compared with 9,661,000 in 1960. For the first half of the year demand was below the 1960 level because general industrial activity slowed down, and weather was warmer than normal in the first quarter. Demand in the third quarter increased 3.7 percent. In the fourth quarter, although warmer than normal weather occurred, demand increased 1.5 percent.

Military purchases from domestic sources averaged 439,000 barrels daily in 1961 compared with 441,000 in 1960.

The new supply of refined products comprises the refinery output from crude oil, the production of natural-gas liquids, a small quantity of motor benzol derived from coal, and imports of refined products from other countries. Crude runs to stills, production of natural-gas liquids, and imports exceeded demand and resulted in a stock increase of 27.5 million barrels.

The yield of gasoline from crude oil declined from 45.2 percent in 1960 to 44.7 percent in 1961. The yield of residual fuel oil continued to decline, decreasing 0.7 percent to 10.5 percent. The yield of distillate fuel oil increased from 22.4 percent in 1960 to 23.2 percent.

The Bureau of Labor Statistics has established a new wholesale-price-index series on petroleum using the years 1957–59 as the base years. The index for refined products for 1961 was 99.3. This compares with 97.6 for 1960, 96.5 for 1959, 97.0 for 1958 and 106.4 for 1957. The average wholesale price of the four principal products, gasoline, kerosine, distillate fuel oil, and residual fuel oil in 1961 was 9.21 cents per gallon compared with 9.15 cents in 1960.

The average price of regular-grade gasoline at refineries in Oklahoma for the year 1961 was 12.80 cents per gallon. The price of 13.38 cents per gallon was steady until May when it was cut 0.5 cent. Part of this price cut was restored June 1, and until the middle of August the price averaged 13.13. Posted prices started declining again in August and continued downward through September when the average for the month was 11.88 cents. The monthly average posted price for December was 12.22 cents per gallon. The average posted price at Oklahoma refineries for kerosine and distillate fuel oil were higher in 1961, but the posting on residual fuel oil was down 1 cent per barrel.

TABLE 39.—Salient statistics of the major refined petroleum products in the United States

(Thousand barrels)

	1957	1958	1959	1960	1961 [1]
Gasoline:					
Production, total	1, 438, 140	1, 439, 511	1, 488, 860	1, 522, 497	1, 531, 669
From crude, total [2]	1, 265, 245	1, 274, 687	1, 320, 107	1, 343, 341	1, 342, 877
Finished gasoline and naphtha	1, 267, 339	1, 272, 976	1, 320, 545	1, 341, 532	1, 344, 819
Unfinished gasoline (net) [3]	−2, 094	1, 711	−438	1, 809	−1, 942
From natural-gas liquids	172, 643	164, 408	168, 429	178, 881	188, 623
Benzol blended	252	416	324	275	169
Imports	2, 906	13, 773	13, 358	9, 790	10, 625
Exports	38, 588	27, 403	16, 743	13, 456	8, 949
Stocks, end of year	196, 776	186, 760	187, 613	194, 774	195, 830
Domestic demand	1, 392, 953	1, 435, 897	1, 485, 221	1, 511, 670	1, 532, 289
Kerosine:					
Production	108, 929	110, 008	110, 662	135, 772	141, 410
Transfers from gasoline plants	1, 780	1, 294	868	1, 070	1, 280
Imports	30	34	114	68	1, 922
Exports	5, 258	1, 217	944	689	230
Stocks, end of year	29, 200	26, 040	26, 856	31, 445	32, 433
Domestic demand	107, 701	113, 279	109, 919	132, 499	[4] 143, 394
Distillate fuel oil:					
Production	668, 573	631, 405	678, 938	667, 050	696, 015
Transfers from gasoline plants	866	773	703	1, 634	607
Transfers from crude	1, 305	950	970	1, 001	851
Imports	8, 566	14, 892	17, 658	12, 771	16, 157
Exports	47, 752	18, 942	12, 734	9, 897	6, 948
Stocks, end of year	149, 449	125, 101	151, 164	138, 455	152, 018
Domestic demand	616, 090	653, 426	659, 983	685, 268	693, 119
Residual fuel oil:					
Production	415, 656	363, 358	347, 900	332, 147	315, 577
Transfers from crude	13, 884	10, 965	7, 386	3, 948	3, 854
Imports	173, 299	182, 036	222, 571	233, 208	235, 183
Exports	38, 570	25, 743	20, 815	18, 495	14, 037
Stocks, end of year	59, 959	59, 508	53, 501	44, 870	44, 869
Domestic demand	548, 801	531, 067	563, 464	559, 439	540, 578
Jet fuel:					
Production	63, 322	73, 676	92, 933	88, 248	95, 210
From gasoline	46, 007	53, 195	64, 225	65, 255	70, 436
From kerosine	12, 572	14, 516	19, 555	14, 004	13, 200
From distillate	4, 743	5, 965	9, 153	8, 989	11, 574
Transfers from gasoline plants	------------	1, 024	758	861	713
Imports	9, 185	20, 810	13, 572	12, 372	10, 208
Exports	119	211	173	113	122
Stocks, end of year	4, 749	5, 871	8, 758	[5] 6, 870	8, 280
Domestic demand	72, 961	94, 177	104, 228	102, 803	104, 599

See footnotes at end of table.

TABLE 39.—Salient statistics of the major refined petroleum products in the United States—Continued

	1957	1958	1959	1960	1961[1]
Lubricants:					
Production	55,723	51,298	56,111	59,389	59,254
Imports	----------	----------	----------	22	14
Exports:					
Grease	428	349	392	393	363
Oil	13,398	12,654	13,580	15,418	16,626
Stocks, end of year	10,864	9,687	8,950	[5] 12,303	12,943
Domestic demand	41,215	39,472	42,878	42,676	41,639
Wax (1 barrel = 280 pounds):					
Production	5,461	5,252	5,630	5,896	5,781
Imports	----------	5	21	6	2
Exports	1,023	911	1,031	1,333	1,237
Stocks, end of year	666	712	774	905	1,061
Domestic demand	4,430	4,300	4,558	4,438	4,390
Coke (5 barrels = 1 short ton):					
Production	33,466	37,808	41,117	60,010	75,333
Exports	5,225	4,405	4,680	6,856	7,238
Stocks, end of year	2,534	4,818	5,705	4,387	5,316
Domestic demand	27,026	31,119	35,550	54,472	67,166
Asphalt (5.5 barrels = 1 short ton):					
Production	85,683	89,380	97,643	98,671	101,819
Imports	6,391	7,478	6,869	6,143	6,622
Exports	1,788	1,364	935	924	631
Stocks, end of year	10,463	9,757	10,948	[5] 12,991	12,999
Domestic demand	88,973	96,200	102,386	104,696	107,802
Road oil:					
Production	7,209	5,925	6,493	5,970	5,820
Stocks, end of year	587	417	653	743	761
Domestic demand	7,123	6,095	6,257	5,880	5,802
Still gas:					
Production	125,720	125,951	126,958	129,480	127,537
Liquefied gases (incl. ethane):					
Production [6]	53,437	57,623	68,692	77,578	78,947
Transfers of liquefied gas [7] from natural gasoline plants	117,029	123,194	146,415	152,173	157,479
Imports	(8)	(8)	(8)	1,631	1,806
Exports	4,526	2,827	2,252	2,988	3,541
Stocks, end of year	1,913	2,207	2,520	3,623	6,298
Domestic demand	165,420	177,696	212,542	227,291	232,016
Miscellaneous:					
Production	15,816	18,718	21,854	24,358	26,267
Transfers from gasoline plants	1,664	1,460	1,449	1,494	2,245
Imports	----------	----------	4	47	----------
Exports	269	266	262	257	245
Stocks, end of year	1,811	2,409	2,281	[5] 2,846	2,832
Domestic demand	16,876	19,314	23,173	25,208	28,281
Other unfinished oils:					
Rerun (net)	−1,355	32,493	25,868	22,094	19,260
Imports	957	33,554	23,072	16,478	25,348
Stocks, end of year	68,966	70,027	67,231	61,615	67,703
Shortage or (overage)	(15,159)	(23,192)	(31,509)	(53,282)	(65,429)

---

[1] Preliminary figures.

[2] Includes production from unfinished oils rerun.

[3] A negative net production figure for unfinished gasoline indicates that a like amount of finished gasoline was not produced from the current years' crude runs but was derived from unfinished gasoline produced in a prior period. Therefore, total gasoline production from crude is always the amount produced from the current years' runs of crude oil and reruns of unfinished oils.

[4] Includes jet fuel used in commercial aircraft: PAD districts I-IV, 32,342; PAD district V, 14,845.

[5] New basis: to include pipeline stocks of jet fuel and bulk terminal stocks of lubricants, asphalt, and miscellaneous oils. December 31, 1960 stocks on old basis for comparison with previous years: Jet fuel, 6,546,000 barrels; lubricants, 9,874,000 barrels; asphalt, 10,142,000 barrels; and miscellaneous oils, 2,715,000 barrels.

[6] Liquefied refinery gases (LR-gases).

[7] Liquefied petroleum gases (LP-gases).

[8] Included with imports of gasoline.

TABLE 40.—Input and output of petroleum products at refineries in the United States

(Thousand barrels)

	1957	1958	1959	1960	[1] 1961
Input:					
Crude petroleum:					
Domestic	2,529,672	2,444,229	2,565,504	2,581,568	2,604,127
Foreign	360,764	345,175	352,157	370,966	383,031
Total crude petroleum	2,890,436	2,789,404	2,917,661	2,952,534	2,987,158
Natural-gas liquids	150,090	137,269	153,323	166,793	169,447
Total input	3,040,526	2,926,673	3,070,984	3,119,327	3,156,605
Output:					
Gasoline	1,415,335	1,411,956	1,473,430	1,510,134	1,512,324
Kerosine [2]	108,929	110,008	110,662	135,772	141,410
Distillate fuel oil [2]	668,573	631,405	678,938	667,050	696,015
Residual fuel oil	415,656	363,358	347,900	332,147	315,577
Jet fuel [2]	63,322	73,676	92,933	88,248	95,210
Lubricants	55,723	51,298	56,111	59,389	59,254
Wax [3]	5,461	5,252	5,630	5,896	5,781
Coke [3]	33,466	37,808	41,117	60,010	75,333
Asphalt [3]	85,683	89,380	97,643	98,671	101,819
Road oil	7,209	5,925	6,493	5,970	5,820
Still gas	125,720	125,951	126,958	129,480	127,537
Liquefied gases	53,437	57,623	68,692	77,578	78,947
Other finished products [2]	15,816	18,718	21,854	24,358	26,267
Other unfinished oils (net)	1,355	[4] −32,493	[4] −25,868	[4] −22,094	[4] −19,260
Shortage (or overage) [5]	−15,159	−23,192	−31,509	−53,282	−65,429
Total output	3,040,526	2,926,673	3,070,984	3,119,327	3,156,605

[1] Preliminary figures.

[2] Production at natural-gasoline plants shown as direct "transfers" and omitted from the input and output at refineries.

[3] Conversion factors: 280 pounds of wax to the barrel; 5.0 barrels of coke to the short ton; 5.5 barrels asphalt to the short ton.

[4] Negative quantity: Represents net excess of unfinished oils rerun over unfinished oil produced.

[5] Includes losses or gains in volume during processing.

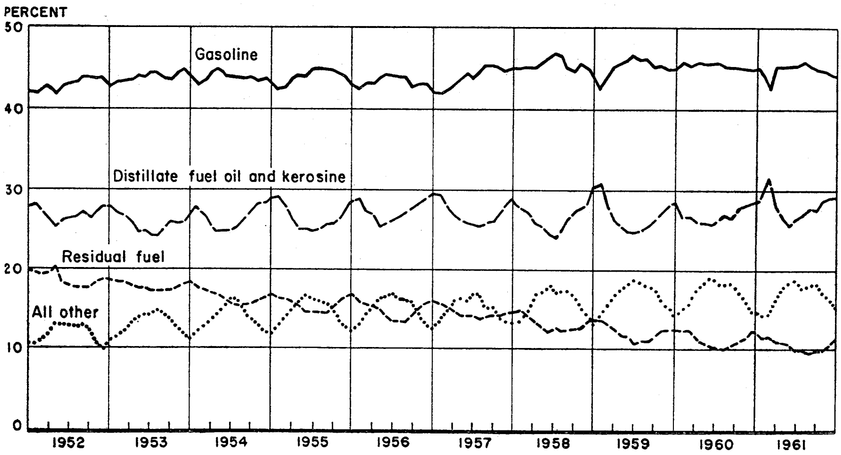

FIGURE 5.—Yields of principal products from crude runs to stills in the United States, 1952–61, by months.

TABLE 41.—Percentage yields of refined petroleum products from crude oil in the United States [1]

Product	1952 [2]	1953	1954	1955	1956	1957	1958	1959	1960	[3] 1961
Finished products:										
Gasoline	42.4	43.9	43.8	44.0	43.4	43.8	45.2	44.9	45.2	44.7
Kerosine	5.3	4.8	4.8	4.3	4.2	3.8	3.9	3.8	4.6	4.7
Distillate fuel oil	21.2	20.7	21.3	22.0	22.9	23.1	22.4	23.1	22.4	23.2
Residual fuel oil	18.5	17.6	16.4	15.3	14.7	14.4	12.9	11.8	11.2	10.5
Jet fuel	.8	1.4	1.8	2.1	2.3	2.2	2.6	3.2	3.0	3.2
Lubricating oil	2.3	2.1	2.1	2.0	2.0	1.9	1.8	1.9	2.0	2.0
Wax	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
Coke	.7	.8	1.0	1.0	1.1	1.2	1.3	1.4	2.0	2.5
Asphalt	2.9	2.8	2.9	3.0	3.1	3.0	3.2	3.3	3.3	3.4
Road oil	.3	.3	.3	.3	.3	.2	.2	.2	.2	.2
Still gas	3.9	4.0	4.0	4.3	4.2	4.3	4.4	4.3	4.4	4.2
Liquefied gases	1.3	1.3	1.3	1.6	1.8	1.9	2.0	2.3	2.6	2.6
Other finished products	.3	.4	.4	.4	.4	.5	.7	.7	.8	.9
Shortage	−.1	−.3	−.3	−.5	−.6	−.5	−.8	−1.1	−1.9	−2.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[1] Other unfinished oils added to crude in computing yields.
[2] Yields computed on the 1953 basis to show jet fuel separately.
[3] Preliminary figures.

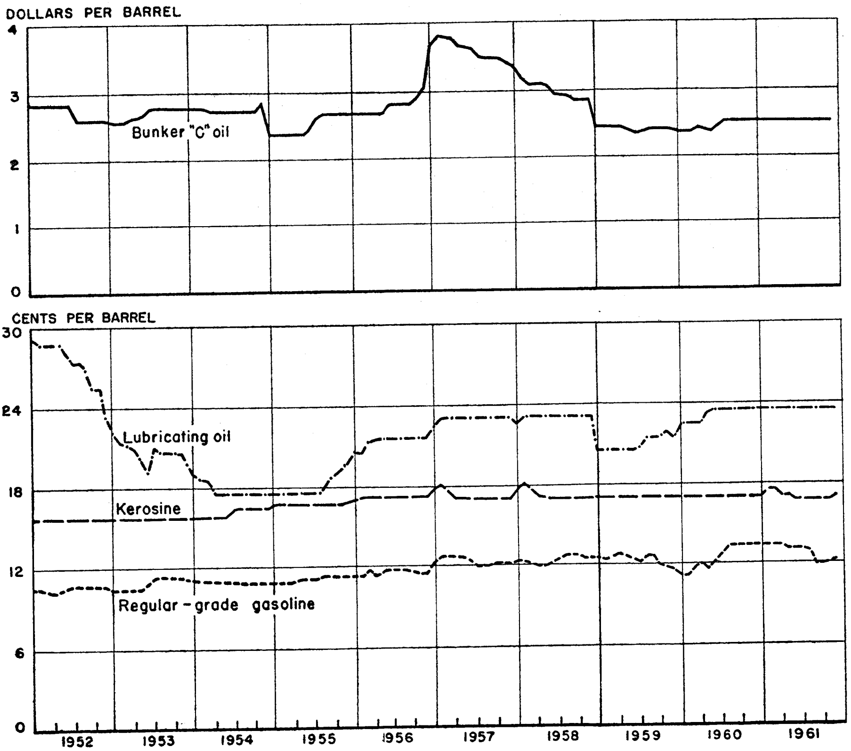

FIGURE 6.—Prices of Bunker "C" oil at New York Harbor, bright stock at Oklahoma refineries, tank-wagon kerosine at Chicago, and regular-grade gasoline at refineries in Oklahoma, 1952–61, by months.

TABLE 42.—Stocks of refined petroleum products in the United States at end of month

(Thousand barrels)

Product	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1960:												
Gasoline [1]	205, 982	217, 139	222, 691	216, 100	210, 509	198, 452	196, 021	190, 322	189, 645	189, 674	188, 726	194, 774
Kerosine	26, 510	23, 020	18, 440	20, 547	24, 217	27, 354	30, 499	33, 379	35, 408	36, 977	36, 722	31, 445
Distillate fuel oil	125, 924	105, 015	73, 948	81, 755	95, 461	109, 174	131, 044	152, 158	168, 235	180, 071	173, 913	138, 455
Residual fuel oil	49, 306	45, 775	40, 503	39, 285	39, 628	41, 074	43, 848	47, 177	50, 136	50, 003	49, 525	44, 870
Jet fuel	6, 846	7, 041	6, 386	6, 556	6, 810	6, 753	6, 892	7, 343	6, 431	6, 034	6, 020	[2] 6, 870
Lubricating oil	9, 365	9, 588	9, 637	9, 665	9, 404	9, 068	9, 032	8, 942	9, 149	9, 194	9, 463	12, 303
Wax	789	799	782	782	814	775	800	820	768	878	892	905
Coke	5, 813	5, 829	5, 954	5, 981	5, 888	5, 834	5, 995	6, 010	6, 039	5, 968	5, 869	4, 387
Asphalt	12, 838	14, 120	15, 266	16, 830	17, 037	15, 760	14, 259	11, 284	9, 110	8, 141	8, 593	[2] 12, 991
Road oil	661	785	878	1, 166	1, 425	1, 435	1, 338	956	701	641	730	743
Liquefied refinery gases	2, 213	2, 189	2, 097	2, 325	2, 544	2, 781	3, 129	3, 318	3, 473	3, 486	3, 651	3, 623
Miscellaneous	2, 579	2, 114	2, 038	1, 980	2, 188	2, 021	2, 403	2, 115	2, 122	2, 133	2, 582	[2] 2, 846
Other unfinished oils	67, 427	69, 039	67, 283	68, 988	73, 023	72, 352	73, 261	71, 137	67, 801	69, 121	66, 548	61, 615
Total 1960	516, 253	502, 453	465, 903	471, 960	488, 948	492, 833	518, 521	534, 961	549, 018	562, 321	553, 234	[2] 515, 827
1961: [3]												
Gasoline [1]	211, 867	222, 189	223, 660	222, 524	213, 399	197, 640	195, 860	191, 597	184, 999	187, 005	186, 850	195, 830
Kerosine	27, 365	24, 471	25, 666	27, 348	28, 384	30, 305	32, 440	33, 929	35, 911	37, 257	36, 224	32, 433
Distillate fuel oil	108, 097	97, 298	87, 950	85, 003	93, 636	109, 513	129, 631	150, 893	165, 445	177, 921	174, 192	152, 018
Residual	42, 934	42, 635	40, 889	41, 848	44, 137	47, 362	50, 242	48, 771	50, 341	48, 969	46, 694	44, 869
Jet fuel	5, 991	6, 417	7, 131	7, 783	7, 621	7, 876	8, 245	8, 455	7, 923	7, 690	7, 797	8, 280
Lubricating oil	12, 376	12, 791	12, 695	13, 388	13, 072	12, 735	12, 882	12, 560	12, 400	12, 279	12, 326	12, 943
Wax	881	894	930	1, 005	990	945	1, 013	1, 039	1, 048	999	1, 014	1, 061
Coke	4, 665	4, 663	5, 126	5, 508	5, 611	5, 553	5, 676	5, 560	5, 474	5, 405	5, 341	5, 316
Asphalt	15, 200	17, 647	19, 189	21, 638	21, 269	19, 275	17, 700	14, 125	12, 145	10, 488	10, 882	12, 999
Road oil	691	809	1, 084	1, 327	1, 573	1, 508	1, 315	1, 018	892	730	748	761
Liquefied refinery gases	3, 718	3, 791	4, 186	4, 475	5, 714	5, 919	6, 165	6, 165	6, 293	6, 523	6, 715	6, 298
Miscellaneous	3, 018	2, 913	2, 765	2, 833	2, 780	2, 869	2, 783	2, 875	2, 858	2, 954	2, 835	2, 832
Other unfinished oils	61, 885	60, 440	63, 259	68, 730	72, 175	76, 258	75, 905	73, 677	72, 452	72, 692	71, 379	67, 703
Total 1961	498, 688	496, 958	494, 530	503, 410	510, 361	517, 758	539, 857	550, 664	558, 181	570, 912	562, 997	543, 343

[1] Includes unfinished gasoline.

[2] New basis: December 31, 1960, stocks on old basis; jet fuel, 6,456,000 bbl; lubricants, 9,874,000 bbl; asphalt, 10,142,000 bbl; and miscellaneous oils, 2,715,000 bbl; total refine products, 510,004,000 bbl.

[3] Preliminary figures.

TABLE 43.—Input and output of petroleum products at refineries in the United States, by months

(Thousand barrels)

	January	February	March	April	May	June	July	August	September	October	November	December	Total
1960:													
Input:													
Crude petroleum	256,659	233,880	245,423	238,809	246,847	243,773	257,522	255,748	242,999	245,157	236,789	248,928	2,952,534
Natural-gas liquids	14,047	12,687	13,324	12,830	13,025	12,914	13,787	14,221	14,186	14,983	14,794	15,720	166,518
Benzol	16	17	23	48	60	12	18	16	16	17	18	14	275
Total input	270,722	246,584	258,770	251,687	259,932	256,699	271,327	269,985	257,201	260,157	251,601	264,662	3,119,327
Output:													
Gasoline [1]	129,694	119,455	125,159	121,395	123,659	124,800	131,522	131,128	125,980	125,035	122,659	129,648	1,510,134
Kerosine [2]	13,547	10,408	11,353	9,745	9,853	9,759	11,164	11,397	10,776	11,993	12,401	13,376	135,772
Distillate fuel oil [2]	59,874	51,877	55,690	52,300	53,841	53,338	56,773	58,081	54,928	56,262	54,877	59,209	667,050
Residual fuel oil	32,452	28,938	31,065	26,410	26,072	25,297	26,265	26,125	25,779	25,755	27,116	30,873	332,147
Jet fuel [2]	7,250	7,314	7,272	7,437	7,338	7,894	7,528	7,796	6,961	6,898	7,291	7,269	88,248
Lubricating oil	4,895	4,614	5,027	5,052	4,953	4,921	5,232	4,689	4,944	4,907	5,094	5,061	59,389
Wax [3]	456	479	511	467	512	462	456	500	453	615	514	471	5,896
Coke [3]	3,839	3,531	3,993	4,047	4,146	5,210	5,662	6,252	5,829	5,765	5,726	6,010	60,010
Asphalt [3]	4,546	4,363	4,769	7,719	9,449	11,042	11,776	12,114	11,147	9,741	6,814	5,191	98,671
Road oil	74	212	152	516	690	842	1,190	943	515	324	245	267	5,970
Still gas	10,572	10,100	10,430	10,872	11,369	11,469	11,291	11,590	10,934	10,692	9,833	10,328	129,480
Liquefied refinery gases	6,260	6,277	6,990	6,591	6,307	6,604	6,747	6,716	6,229	5,997	6,128	6,732	77,578
Miscellaneous [2]	1,966	1,512	2,224	2,225	2,292	1,825	2,092	1,692	2,066	2,072	2,164	2,228	24,358
Other unfinished oils (net)	[4] −1,067	397	[4] −3,031	181	2,835	[4] −2,044	[4] −877	[4] −3,416	[4] −4,594	[4] −428	[4] −4,021	[4] −6,029	[4] −22,094
Shortage or (overage)	(3,636)	(2,893)	(2,834)	(3,270)	(3,384)	(4,720)	(5,494)	(5,622)	(4,746)	(5,471)	(5,240)	(5,972)	(53,282)
Total output	270,722	246,584	258,770	251,687	259,932	256,699	271,327	269,985	257,201	260,157	251,601	264,662	3,119,327
1961: [5]													
Input:													
Crude petroleum	259,349	236,756	250,964	234,577	248,973	239,579	256,974	262,109	239,280	253,534	246,142	258,921	2,987,158
Natural-gas liquids	15,003	12,556	13,388	13,010	13,811	13,566	13,966	13,939	13,296	15,191	15,898	15,654	169,278
Benzol	14	15	13	13	18	12	17	11	13	15	15	13	169
Total input	274,366	249,327	264,365	247,600	262,802	253,157	270,957	276,059	252,589	268,740	262,055	274,588	3,156,605
Output:													
Gasoline [1]	130,335	114,204	126,066	117,186	125,880	121,163	133,295	134,382	121,916	129,221	126,603	132,073	1,512,324
Kerosine [2]	13,857	12,040	12,679	10,555	9,921	9,466	11,125	11,325	11,259	13,134	12,450	13,599	141,410
Distillate fuel oil [2]	64,433	63,248	55,967	49,861	52,868	52,503	58,234	61,208	54,571	59,898	59,508	63,716	696,015
Residual fuel oil	29,894	27,758	27,383	24,990	26,551	23,318	25,824	25,212	23,851	25,106	25,713	29,977	315,577
Jet fuel [2]	6,709	6,674	8,878	7,973	8,301	7,539	8,072	8,862	7,967	7,532	8,154	8,549	95,210

See footnotes at end of table.

TABLE 43.—Input and output of petroleum products in the United States, by months—Continued

	January	February	March	April	May	June	July	August	September	October	November	December	Total
1961:[5]													
Output:													
Lubricating oil	4,716	4,723	5,025	5,065	5,276	4,562	5,153	5,144	4,547	5,075	5,020	4,948	59,254
Wax [3]	475	481	545	522	454	450	498	496	460	444	493	463	5,781
Coke [3]	6,302	5,607	6,187	6,238	6,090	6,181	6,624	6,712	5,916	6,458	6,348	6,670	75,333
Asphalt [3]	4,979	4,529	5,925	7,691	9,395	10,878	11,798	11,899	10,865	10,518	7,551	5,791	101,819
Road oil	168	188	358	392	717	914	991	975	525	247	172	173	5,820
Still gas	10,114	9,764	10,485	9,821	11,118	10,537	11,972	11,418	10,748	10,563	10,328	10,669	127,537
Liquefied refinery gases	6,947	6,413	6,864	6,617	7,140	6,604	6,171	6,439	5,889	6,254	6,557	7,052	78,947
Miscellaneous [2]	2,168	1,884	2,167	2,174	2,568	2,266	1,854	2,159	2,233	2,357	2,098	2,339	26,267
Other unfinished oils (net)	[4] −1,487	[4] −2,910	1,134	3,514	1,374	1,668	[4] −3,899	[4] −4,541	[4] −3,026	[4] −2,228	[4] −3,331	[4] −5,528	[4] −19,260
Shortage or (overage)	(5,244)	(5,276)	(5,298)	(4,999)	(4,851)	(4,892)	(6,755)	(5,631)	(5,132)	(5,839)	(5,609)	(5,903)	(65,429)
Total output	274,366	249,327	264,365	247,600	262,802	253,157	270,957	276,059	252,589	268,740	262,055	274,588	3,156,605

---

[1] Includes unfinished gasoline (net).

[2] Production at natural-gasoline plants shown as direct "transfers" and omitted from the input and output at refineries.

[3] Conversion factors: 280 pounds of wax to the barrel; 5.0 barrels of coke to the short ton; 5.5 barrels of asphalt to the short ton.

[4] Negative quantity; represents net excess of unfinished oils rerun over unfinished oil produced.

[5] Preliminary figures.

TABLE 44.—Input and output of petroleum products at refineries in the United States, by districts

(Thousand barrels)

	East Coast	Appalachian No. 1	Appalachian No. 2	Indiana, Illinois, Kentucky etc.	Minnesota, Wisconsin, etc.	Oklahoma, Kansas, etc.	Texas Inland	Texas Gulf Coast	Louisiana Gulf Coast	Arkansas-Louisiana Inland etc.	New Mexico	Rocky Mountain	West Coast	Total
1960:														
Input:														
Crude petroleum	410,144	35,151	36,680	538,458	44,489	264,330	106,936	694,839	242,306	39,403	8,490	104,437	426,871	2,952,534
Natural-gas liquids	1,750	5	71	14,757	767	16,320	28,518	48,372	17,007	8,536	983	3,237	26,195	166,518
Benzol	101	--------	--------	16	--------	--------	--------	143	--------	--------	--------	15	--------	275
Total input	411,995	35,156	36,751	553,231	45,256	280,650	135,454	743,354	259,313	47,939	9,473	107,689	453,066	3,119,327
Output:														
Gasoline [1]	188,358	14,592	18,862	278,836	21,066	146,579	80,084	357,728	130,454	23,900	4,536	49,641	195,498	1,510,134
Kerosine [2]	12,893	1,288	1,907	27,143	1,958	5,155	3,392	44,455	22,172	2,078	120	1,169	12,042	135,772
Distillate fuel oil [2]	120,615	7,936	6,892	114,715	10,639	65,120	17,801	168,100	53,182	8,106	1,521	23,878	68,545	667,050
Residual fuel oil	55,686	3,844	4,485	60,369	6,532	8,486	7,417	51,212	16,784	2,403	881	11,505	102,543	332,147
Jet fuel [2]	3,064	94	400	7,362	779	16,372	12,712	14,748	8,315	885	1,368	5,322	16,827	88,248
Lubricating oil	8,642	3,366	486	4,861	--------	4,754	182	22,485	6,409	2,062	--------	324	5,818	59,389
Wax [3]	2,025	266	58	356	--------	678	57	1,253	607	--------	--------	82	514	5,896
Coke [3]	10,076	101	362	13,747	1,638	7,469	1,025	9,068	3,986	1,677	28	2,521	8,312	60,010
Asphalt [3]	21,550	1,250	2,434	18,825	1,340	10,393	4,756	7,782	4,442	4,252	488	7,017	14,142	98,671
Road oil	24	--------	--------	1,786	233	1,058	--------	12	29	13	--------	1,467	1,348	5,970
Still gas	16,159	1,763	2,050	26,380	1,531	10,959	5,643	26,113	7,528	2,259	223	4,139	24,733	129,480
Liquefied refinery gases	9,793	572	153	8,189	746	6,251	3,324	20,404	16,264	908	57	1,499	9,418	77,578
Miscellaneous [2]	3,803	600	28	1,167	62	1,026	697	8,722	3,130	328	3	313	4,479	24,358
Other unfinished oils (net)	[4]—31,928	[4]—331	[4]—413	[4]—421	[4]—99	[4]—1,316	[4]—1,946	25,359	[4]—3,948	[4]—581	4	164	[4]—6,638	[4]—22,094
Shortage or (overage)	(8,765)	(185)	(953)	(10,084)	(1,169)	(2,334)	310	(14,087)	(10,041)	(351)	244	(1,352)	(4,515)	(53,282)
Total output	411,995	35,156	36,751	553,231	45,256	280,650	135,454	743,354	259,313	47,939	9,473	107,689	453,066	3,119,327
1961: [5]														
Input:														
Crude petroleum	409,923	36,406	35,855	544,776	44,746	262,730	110,872	688,042	255,378	41,115	8,906	103,639	444,770	2,987,158
Natural-gas liquids	1,994	68	54	13,658	969	18,379	24,118	53,739	17,937	8,245	1,038	3,573	25,506	169,278
Benzol	78	--------	--------	17	--------	--------	--------	55	--------	1	--------	18	--------	169
Total input	411,995	36,474	35,909	558,451	45,715	281,109	134,990	741,836	273,315	49,361	9,944	107,230	470,276	3,156,605
Output:														
Gasoline [1]	184,950	15,298	18,356	280,029	21,252	147,952	78,112	352,715	133,617	24,325	4,750	49,437	201,531	1,512,324
Kerosine [2]	12,911	1,396	1,992	27,256	2,019	5,937	4,034	43,746	22,847	1,573	172	1,616	15,911	141,410
Distillate fuel oil [2]	125,142	8,551	6,824	116,782	10,614	64,126	17,802	180,878	59,139	9,157	1,601	23,169	72,230	696,015

See footnotes at end of table.

TABLE 44.—Input and ontput of petroleum products at refineries in the United States, by districts—Continued

	East Coast	Appalachian No. 1	Appalachian No. 2	Indiana, Illinois, Kentucky etc.	Minnesota, Wisconsin, etc.	Oklahoma, Kansas, etc.	Texas Inland	Texas Gulf Coast	Louisiana Gulf Coast	Arkansas-Louisiana Inland etc.	New Mexico	Rocky Mountain	West Coast	Total
1961:[5]														
Output—Continued														
Residual fuel oil	53,873	3,701	3,954	55,885	6,426	6,722	7,074	46,176	16,537	2,210	820	12,282	99,917	315,577
Jet fuel [2]	3,083	226	332	11,457	1,243	14,836	13,189	14,448	9,605	922	1,419	5,817	18,633	95,210
Lubricating oil	7,922	3,077	368	4,896	---------	4,766	174	22,530	7,039	1,939	---------	339	6,204	59,254
Wax [3]	1,983	246	67	407	---------	587	70	1,285	555	---------	---------	73	508	5,781
Coke [3]	13,049	180	395	16,958	1,757	8,578	1,780	13,036	5,092	2,017	43	2,561	9,887	75,333
Asphalt [3]	22,003	1,453	2,399	18,951	1,421	11,297	4,888	7,129	5,356	4,786	454	7,149	14,533	101,819
Road oil	30	---------	5	1,749	196	1,073	---------	5	3	10	---------	1,588	1,161	5,820
Still gas	15,908	1,665	1,909	26,984	1,513	10,632	5,194	23,681	7,675	2,062	242	4,039	26,033	127,537
Liquefied refinery gases	10,345	596	165	8,958	604	6,831	3,567	20,765	14,532	916	147	1,457	10,064	78,947
Miscellaneous [2]	4,236	736	36	1,711	62	1,143	821	7,527	5,062	167	---------	255	4,511	26,267
Other unfinished oils (net)	[4]−31,622	[4]−361	[4]−293	138	[4]−135	551	[4]−1,185	21,974	[4]−2,005	[4]−235	31	[4]−821	[4]−5,297	[4]−19,260
Shortage or (overage)	(11,818)	(290)	(600)	(13,710)	(1,257)	(3,922)	(530)	(14,059)	(11,739)	(488)	265	(1,731)	(5,550)	(65,429)
Total output	411,995	36,474	35,909	558,451	45,715	281,109	134,990	741,836	273,315	49,361	9,944	107,230	470,276	3,156,605

---

[1] Includes unfinished gasoline (net).

[2] Production at natural gasoline plants shown as direct "transfers" and omitted from the input and output at refineries.

[3] Conversion factor: 280 pounds of wax to the barrel; 5.0 barrels of coke to the short ton; 5.5 barrels of asphalt to the short ton.

[4] Negative quantity; represents net excess of unfinished oils rerun over unfinished oils produced.

[5] Preliminary figures.

REFINERY CAPACITY

The total installed crude-oil-refining capacity as of January 1, 1962, was 10,105,147 barrels daily. The gain in installed capacity for the year was 95,074 barrels daily. The total number of petroleum refineries in the United States did not change during the year, but only 287 were reported as operating as of January 1, 1962, compared with 289 a year ago. The capacity of the average refinery to process crude oil increased from 32,187 barrels in 1961 to 32,492 in 1962.

The operating ratio of the petroleum refining industry at the beginning of 1962, as indicated by the ratio of the January 1962 crude runs to the total installed operable capacity was 85.6 percent. This compares with an operating ratio of 83.7 percent at the beginning of 1961.

TABLE 45.—Petroleum refinery capacity in the United States, January 1

	Number of refineries				Crude-oil throughput capacity (barrels per day)				
						Shutdown			
	Operating	Shutdown	Total	Building	Operating	Operable	Inoperable	Total	Building
1957	298	21	319	3	8, 808, 841	262, 856	51, 977	9, 123, 674	256, 350
1958	288	30	318	2	8, 939, 907	418, 400	49, 400	9. 407. 707	185, 265
1959	291	22	313	--------	9, 450, 741	310, 705	58, 400	9, 819, 846	108, 400
1960	290	20	310	2	9. 543, 329	299, 295	58, 800	9, 901, 424	70, 947
1961[1]	289	22	311	--------	9, 629, 685	368, 888	11, 500	10, 010, 073	36, 500
1962 [2]	287	24	311	1	9, 812, 248	220, 799	72, 100	10, 105, 147	110, 350

[1] Revised.
[2] Preliminary.

AVIATION GASOLINE

The total demand for aviation-grade gasoline was 62.7 million barrels, decreasing 9.2 percent from 1961. Plant production increased almost 1.5 percent, but more of the output was used in automotive gasoline instead of being finished to aviation gasoline (55.5 million barrels in 1961 compared with 43.3 million in 1960). Exports declined 2.9 million barrels for the year. According to the refinery reports, 1961 deliveries to the military averaged 76,000 barrels daily, which represented half of the domestic demand for aviation gasoline.

Jet-type fuels are not included in aviation gasoline. The fuel used in commercial jet planes (mostly straight kerosine) is reported in another section of this chapter under kerosine and that used by the military is reported under the section on jet fuel.

GASOLINE

The total demand for gasoline in 1961 averaged 4,223,000 barrels daily, increasing 1.3 percent over 1960. Exports were 32 percent lower for the year, and domestic demand was 4,198,000 barrels daily.

Production.—The total gasoline production in 1961 was 1,531.7 million barrels of which 1,342.9 million was produced from crude oil, 188.6 million from natural-gas liquids, and 0.2 million barrels from benzol.

Yields.—The yield of gasoline from crude oil declined from 45.2 percent in 1960 to 44.7 percent in 1961. The demand for gasoline was below expected levels, and refiners, faced with high gasoline inventories, had to reduce the gasoline yields.

Domestic Demand.—For the first quarter of 1961, domestic demand exceeded the same period of 1960 by 3.1 percent, and the outlook for gasoline demand for the year was optimistic. Second-quarter results were less encouraging as domestic demand was 0.2 percent below the same quarter of 1960. Demand improved in the third and fourth quarters but not at the rate of gain shown in the first quarter. For the year, domestic demand totaled 1,532.3 million barrels, 1.4 percent higher than in 1960. Civilian highway use of gasoline, as calculated from data compiled by the Bureau of Public Roads totaled 1,347.8 million barrels in 1961 compared with 1,319.8 million barrels in 1960. Aviation gasoline declined from 59.0 million barrels in 1960 to 55.6 million in 1961. Nonhighway motor vehicles, military motor vehicles, stationary and marine engines, and losses consumed the remainder (128.9 million barrels).

Production and Consumption by States.—Table shows gasoline production, consumption by PAD Districts, and the interdistrict shipments which balance the supply for each district. The consumption data, compiled by the American Petroleum Institute excludes special naphtha and offshore military shipments. For comparative purposes in this table, the naphtha has been excluded from gasoline production. No breakdown by districts is available on the 19.3 million barrels of natural-gas liquids which were blended with gasoline at terminal facilities away from the refineries in 1961; therefore, it has been omitted from the production figures. This roughly offsets the omission of offshore military shipments in consumption data.

Method of Distribution.—Gasoline deliveries by pipeline increased from 712.0 million barrels in 1960 to 723.4 million in 1961. Gasoline represented 63.7 percent of the total volume transported by product pipelines. Tidewater shipments of gasoline from the gulf coast to the Atlanta Coastal States totaled 241.9 million barrels and to the Pacific Coastal States, 1.1 million barrels. Shipments of gasoline from the west coast to the east coast were almost a million barrels lower for the year (1.2 million in 1960 compared with 0.3 million in 1961). Interdistrict barge shipments from the Gulf Coast States up the Mississippi River were 49.2 million barrels in 1961. Data on intradistrict barge shipments of gasoline is not available, but the volume is presumed to be large.

Stocks.—Stocks of finished gasoline, as reported, included those held at refineries, at bulk terminals operated by refining and pipeline companies, but did not include those held by secondary distributors, by consumers, or in military custody. The Bureau of Mines definition of a bulk-terminal installation is any storage facility operated by refining or pipeline companies which receives its principal products by tanker, barge, or pipeline or any storage point, which has a combined capacity for storing gasoline, kerosine, distillate fuel oil, residual fuel oil, or jet fuels of 50,000 barrels or more, regardless of transportation means by which products are received.

There are definite normal seasonal variations in gasoline storage because of a summer peak and a winter low in gasoline demand. These stocks build up in the winter, although refinery yields are lower, and decrease sharply during the summer. This variation in stocks makes unnecessary large variations in seasonal yields of gasoline from crude oil. Demand for distillate fuel oil, the exact reverse, is high in winter and low in summer.

Stocks of finished and unfinished gasoline were considered high all through the year 1960 and continued to climb during the first 5 months of 1961. Industry spokesmen made several attempts to warn the industry of the effects of excessive stock build-ups, and some progress was made in curtailing crude runs and gasoline yields. However, at the close of 1961, stocks of finished and unfinished gasoline were 1 million barrels higher than a year ago.

Prices.—The dealer's average net price for Regular-grade gasoline (exclusive of dealer's margin and sales tax) in 55 representative cities in the United States provides an index of wholesale gasoline prices. The average service-station price (excluding taxes) decreased from 20.99 cents per gallon in 1960 to 20.53 cents in 1961. The average tax on gasoline in 1961 was 10.23 cents per gallon. Federal tax was 4 cents per gallon; State taxes averaged 6.16 cents per gallon; and local taxes were 0.07 cents per gallon.

TABLE 46.—Salient statistics of aviation gasoline in the United States,[1] by months

(Thousands of barrels)

Item	1961													1960 total
	January	February	March	April	May	June	July	August	September	October	November	December	Total	
Production, total	9,645	8,582	9,557	9,215	10,155	9,446	9,602	10,832	9,910	9,894	9,058	9,998	115,894	114,225
By grades:														
115-145-octane	3,374	3,163	2,893	3,222	3,117	2,877	3,603	3,419	3,755	3,844	3,773	3,581	40,621	41,701
108-135-octane	----------	1	----------	25	41	19	26	----------	----------	22	----------	----------	134	478
100-130-octane	1,731	1,188	1,440	1,237	1,534	1,284	1,436	1,564	1,437	1,309	1,245	1,153	16,558	20,004
91-98-octane	144	118	101	104	109	156	94	188	59	107	96	23	1,299	2,188
Other grades	289	199	373	283	275	389	390	403	318	499	247	177	3,842	4,037
Alkylate (net) [2]	4,107	3,913	4,750	4,344	5,079	4,721	4,053	5,258	4,341	4,113	3,697	5,064	53,440	45,817
By district:														
District 1	780	772	934	810	990	1,170	974	982	791	997	479	744	10,423	10,471
District 2	2,039	1,818	2,131	2,184	2,188	1,998	2,046	2,680	2,486	2,178	2,097	2,390	26,235	23,524
District 3	4,868	4,371	4,644	4,512	4,850	4,452	4,713	5,312	4,588	4,953	4,643	5,083	56,989	57,981
District 4	207	179	211	206	412	218	251	229	258	224	241	246	2,882	1,930
District 5	1,751	1,442	1,637	1,503	1,715	1,608	1,618	1,629	1,787	1,542	1,598	1,535	19,365	20,319
Stocks, total	13,058	13,047	12,800	11,798	12,260	11,628	10,652	10,778	10,555	11,348	11,053	11,627	11,627	13,938
By grades:														
115-145-octane	4,162	4,228	4,019	3,661	3,757	3,657	3,313	3,523	3,653	4,175	4,250	4,480	4,480	4,412
108-135-octane	7	4	2	23	40	40	2	2	1	23	1	1	1	37
100-130-octane	3,036	2,872	2,924	2,564	2,718	2,420	2,540	2,576	2,717	2,649	2,554	2,675	2,675	2,861
91-98-octane	617	610	556	538	507	534	478	502	476	479	487	432	432	602
Other grades	802	759	816	781	592	550	641	697	639	750	681	635	635	799
Alkylate	4,434	4,574	4,483	4,231	4,646	4,427	3,678	3,478	3,069	3,272	3,080	3,404	3,404	5,227
By district:														
District 1	1,090	1,029	1,103	1,043	1,033	1,162	1,130	1,340	1,115	1,433	1,178	1,091	1,091	1,056
District 2	2,529	2,591	2,661	2,767	2,623	2,233	2,193	2,333	2,518	2,389	2,591	2,442	2,442	2,529
District 3	6,285	6,210	5,995	5,310	5,378	5,208	4,444	4,590	4,308	4,715	4,221	5,007	5,007	6,632
District 4	228	214	223	102	251	247	158	143	156	155	172	194	194	731
District 5	2,926	3,003	2,818	2,576	2,975	2,778	2,727	2,372	2,458	2,656	2,891	2,893	2,893	2,990
Transfers out [3]	4,872	3,796	5,008	4,440	4,933	4,909	4,903	5,411	4,723	3,920	3,870	4,738	55,523	43,327
Total demand	5,653	4,797	4,796	5,777	4,760	5,169	5,675	5,295	5,410	5,181	5,483	4,686	62,682	68,999
By grades:														
115-145-octane	3,574	3,002	2,985	3,569	2,953	2,923	3,889	3,189	3,560	3,291	3,655	3,309	39,899	40,970
108-135-octane	30	4	2	3	24	19	58	----------	1	----------	22	----------	163	616
100-130-octane	1,543	1,318	1,372	1,555	1,354	1,566	1,270	1,515	1,282	1,368	1,319	1,020	16,482	19,930
91-98-octane	126	114	128	117	116	121	111	160	83	100	81	76	1,333	2,188
Other grades	271	240	305	295	286	427	287	323	220	219	238	147	3,258	3,740
Alkylate	109	119	4	238	27	113	60	108	264	203	168	134	1,547	1,555

Shipments originating in—														
District 1	255	338	350	277	517	516	185	106	425	177	302	239	3,687	3,938
District 2	518	550	493	611	560	722	607	708	553	737	512	608	7,179	9,213
District 3	3,364	2,746	2,453	3,134	2,606	2,538	3,701	3,150	3,174	3,088	3,525	2,531	36,010	39,626
District 4	74	65	70	219	83	94	103	88	101	95	81	91	1,164	1,109
District 5	1,442	1,098	1,430	1,536	994	1,299	1,079	1,243	1,157	1,084	1,063	1,217	14,642	15,113
Exports, total	833	302	385	961	390	926	482	645	705	471	792	169	7,061	9,985
By district:														
District 1	18	19	12	34	31	94	52	17	54	17	20	4	372	630
District 2	5		2	3	1	3	2	3		25	8		52	189
District 3	580	162	296	686	266	680	334	425	542	221	714	145	5,051	7,349
District 4	4	4	2	4	5	6	1	2	1	1			30	9
District 5	226	117	73	234	87	143	93	198	108	207	50	20	1,556	1,808
Domestic demand	4,820	4,495	4,411	4,816	4,370	4,243	5,193	4,650	4,705	4,710	4,691	4,517	55,621	59,014

---

[1] Included in gasoline figures in other tables of this report. [2] Excludes alkylate produced and blended to finish avgas during the month.

[3] Represents alkylate and a small quantity of finished avgas transferred or used in the output of other products, mainly automotive gasoline.

TABLE 47.—Salient statistics of gasoline in the United States, 1959 total and 1960–61 by months

(Thousand barrels)

	1960													1959 total
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	
Production:														
Finished gasoline and naphtha from crude oil	115,020	107,398	110,735	107,864	111,636	111,505	116,686	118,192	112,327	109,999	106,554	113,616	1,341,532	1,320,545
Unfinished gasoline (net)	611	−647	1,077	653	−1,062	369	1,031	−1,301	−549	36	1,293	298	1,809	−438
Total gasoline production from crude	115,631	106,751	111,812	108,517	110,574	111,874	117,717	116,891	111,778	110,035	107,847	113,914	1,343,341	1,320,107
Gasoline produced from natural-gas liquids	14,642	13,509	14,321	14,253	13,932	14,103	14,916	15,139	14,965	16,400	15,939	16,762	178,881	168,429
Benzol blended	16	17	23	48	60	12	18	16	16	17	18	14	275	324
Total gasoline production	130,289	120,277	126,156	122,818	124,566	125,989	132,651	132,046	126,759	126,452	123,804	130,690	1,522,497	1,488,860
Daily average	4,203	4,147	4,070	4,094	4,018	4,200	4,279	4,260	4,225	4,079	4,127	4,216	4,160	4,079
Imports	257	635	467	661	571	1,254	1,037	948	1,396	840	781	943	9,790	13,358
Exports	997	878	1,224	1,613	1,470	1,272	1,102	1,096	1,185	1,056	890	673	13,456	16,743
Daily average	32	30	39	54	47	42	36	35	40	34	30	22	37	46
Stocks, end of period:														
Finished gasoline	193,575	205,379	209,854	202,610	198,081	185,655	182,193	177,795	177,667	177,660	175,419	181,169	181,169	175,817
Unfinished gasoline	12,407	11,760	12,837	13,490	12,428	12,797	13,828	12,527	11,978	12,014	13,307	13,605	13,605	11,796
Total stocks	205,982	217,139	222,691	216,100	210,509	198,452	196,021	190,322	189,645	189,674	188,726	194,774	194,774	187,613
Domestic demand	111,180	108,877	119,847	128,457	129,258	138,028	135,017	137,597	127,647	126,207	124,643	124,912	1,511,670	1,485,277
Daily average	3,586	3,754	3,866	4,282	4,170	4,601	4,355	4,439	4,255	4,071	4,155	4,029	4,130	4,069
	1961 [1]													1960 total
Production:														
Finished gasoline and naphtha from crude oil	114,930	102,196	111,897	104,211	111,708	108,181	119,866	120,714	109,941	112,620	110,977	117,578	1,344,819	1,341,532
Unfinished gasoline (net)	388	−563	768	−48	343	−596	−554	−282	−1,334	1,395	−287	−1,172	−1,942	1,809
Total gasoline production from crude	115,318	101,633	112,665	104,163	112,051	107,585	119,312	120,432	108,607	114,015	110,690	116,406	1,342,877	1,343,341
Gasoline produced from natural-gas liquids	16,409	14,137	14,952	14,401	15,272	15,573	15,752	16,010	14,650	16,616	17,507	17,344	188,623	178,881
Benzol blended	14	15	13	13	18	12	17	11	13	15	15	13	169	275
Total gasoline production	131,741	115,785	127,630	118,577	127,341	123,170	135,081	136,453	123,270	130,646	128,212	133,763	1,531,669	1,522,497
Daily average	4,250	4,135	4,117	3,953	4,108	4,106	4,357	4,402	4,109	4,214	4,274	4,315	4,196	4,160

Imports	851	645	975	609	1,239	603	1,160	440	1,103	732	908	1,360	10,625	9,790
Exports	1,044	519	542	1,134	552	1,060	627	782	856	620	916	297	8,949	13,456
Daily average	34	19	17	38	18	35	20	25	29	20	31	10	25	37
Stocks, end of period:														
Finished gasoline	197,874	208,759	209,462	208,374	198,906	183,743	182,517	178,536	173,272	173,883	174,015	184,167	184,167	181,169
Unfinished gasoline	13,993	13,430	14,198	14,150	14,493	13,897	13,343	13,061	11,727	13,122	12,835	11,663	11,663	13,605
Total stocks	211,867	222,189	223,660	222,524	213,399	197,640	195,860	191,597	184,999	187,005	186,850	195,830	195,830	194,774
Domestic demand	114,455	105,589	126,592	119,188	137,153	138,472	137,394	140,374	130,115	128,752	128,359	125,846	1,532,289	1,511,670
Daily average	3,692	3,771	4,084	3,973	4,424	4,616	4,432	4,528	4,337	4,153	4,279	4,060	4,198	4,130

---

[1] Preliminary figures.

TABLE 48.—Production of gasoline in the United States in 1961,[1] by districts and months

(Thousand barrels unless otherwise stated)

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Gasoline from crude oil (excludes net unfinished):													
East Coast	15,507	14,489	14,301	14,050	15,286	14,387	16,595	15,946	15,879	15,393	14,196	16,298	182,327
Appalachian No. 1	1,278	1,134	1,268	1,219	1,295	1,280	1,030	1,153	1,360	1,456	1,385	1,396	15,254
Appalachian No. 2	1,528	1,321	1,432	1,515	1,664	1,249	1,719	1,754	1,742	1,688	1,546	1,615	18,773
Indiana, Illinois, Kentucky, etc	22,022	19,660	22,626	20,013	20,298	20,623	22,941	23,902	22,550	22,206	21,502	23,319	261,662
Minnesota, Wisconsin, etc	1,873	1,661	1,820	1,594	1,147	1,792	1,782	1,822	1,517	1,758	1,659	1,874	20,299
Oklahoma, Kansas, etc	11,411	9,983	9,573	9,010	10,050	11,389	11,595	11,657	11,127	9,769	10,573	10,863	127,000
Texas Inland	3,926	3,718	4,384	4,128	4,045	4,292	4,455	4,753	4,530	4,409	4,498	4,565	51,703
Texas Gulf Coast	23,686	22,306	25,126	23,628	24,260	22,037	25,651	25,348	18,590	23,231	22,865	24,120	280,848
Louisiana Gulf Coast	9,726	8,507	9,592	8,717	10,654	9,352	9,979	9,901	9,386	9,760	9,589	9,949	115,112
Arkansas, Louisiana Inland, etc	1,255	1,196	1,336	1,069	1,362	1,189	1,282	1,338	1,264	1,150	1,286	1,385	15,112
New Mexico	259	290	291	341	311	320	330	324	352	328	310	252	3,708
Rocky Mountain	3,964	3,449	3,639	3,488	3,970	3,908	3,948	3,975	3,916	3,580	3,762	4,117	45,716
West Coast	14,620	12,540	13,973	13,171	15,222	13,767	15,612	15,777	15,149	14,992	15,198	15,128	175,149
Total gasoline	111,055	100,254	109,361	101,943	109,564	105,585	116,919	117,650	107,362	109,720	108,369	114,881	1,312,663
Naphtha:													
East Coast	278	84	114	129	100	99	73	137	79	101	82	133	1,409
Appalachian No. 1	18	22	21	22	23	26	23	37	28	37	19	25	301
Appalachian No. 2	1	4	2	2	4	11	18	4	2	18	4	1	71
Indiana, Illinois, Kentucky, etc	308	278	525	134	48	443	397	342	336	290	342	442	3,885
Minnesota, Wisconsin, etc	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
Oklahoma, Kansas, etc	185	167	269	259	250	191	257	223	209	187	237	189	2,623
Texas Inland	48	42	64	61	44	26	46	33	35	73	40	24	536
Texas Gulf Coast	2,439	1,155	1,397	1,421	1,410	1,350	1,712	1,934	1,674	1,931	1,603	1,693	19,719
Louisiana Gulf Coast	71	57	39	69	62	82	90	45	77	77	98	59	826
Arkansas, Louisiana Inland, etc	155	81	79	98	88	90	79	72	72	71	72	69	1,026
New Mexico	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
Rocky Mountain	10	18	6	1	27	17	10	9	12	14	24	15	163
West Coast	362	34	20	72	88	261	242	228	55	101	87	47	1,597
Total naphtha	3,875	1,942	2,536	2,268	2,144	2,596	2,947	3,064	2,579	2,900	2,608	2,697	32,156
Total gasoline and naphtha from crude	114,930	102,196	111,897	104,211	111,708	108,181	119,866	120,714	109,941	112,620	110,977	117,578	1,344,819
Unfinished gasoline (net):													
East Coast	−198	−476	679	337	−285	−437	−281	358	−565	140	181	−311	−858
Appalachian No. 1	−34	−24	−10	−37	−42	−27	14	−7	−69	−32	−38	−19	−325
Appalachian No. 2	−21	−39	−18	−13	−25	−7	−17	−60	−72	−96	−109	−65	−542
Indiana, Illinois, Kentucky, etc	146	416	149	160	153	−314	−216	−241	206	304	118	−74	807
Minnesota, Wisconsin, etc	−8	----------	−7	----------	9	−8	−2	1	2	−3	----------	----------	−16

Oklahoma, Kansas, etc	72	−94	−35	−19	229	−242	−34	−66	−77	238	−146	124	−50
Texas Inland	105	140	172	194	115	129	196	97	101	445	155	−94	1,755
Texas Gulf Coast	152	−224	−370	−251	183	274	−597	277	−570	113	−10	−623	−1,646
Louisiana Gulf Coast	−54	−13	−6	−31	−7	5	−26	56	−48	−51	−21	−62	−258
Arkansas, Louisiana Inland, etc	9	−26	12	−8	9	−14	----------	11	22	14	−39	−49	−59
New Mexico	3	----------	----------	----------	−1	----------	----------	−1	----------	----------	3	----------	4
Rocky Mountain	−7	10	42	−51	39	−23	−52	67	−23	6	−47	6	−33
West Coast	223	−233	160	−329	−34	68	461	−774	−241	317	−334	−5	−721
Total unfinished gasoline (net)	388	−563	768	−48	343	−596	−554	−282	−1,334	1,395	−287	−1,172	−1,942
Percentage yield of gasoline and naphtha[2]	44.2	42.4	45.1	45.1	45.2	45.2	45.7	45.1	44.8	44.6	44.3	44.0	44.7
Natural-gas liquids blended at refineries	15,003	12,556	13,388	13,010	13,811	13,566	13,966	13,939	13,296	15,191	15,898	15,654	169,278
Benzol blended	14	15	13	13	18	12	17	11	13	15	15	13	169
Refinery production:													
East Coast	15,866	14,256	15,195	14,679	15,191	14,086	16,508	16,642	15,563	15,818	14,651	16,495	184,950
Appalachian No. 1	1,276	1,140	1,279	1,204	1,276	1,279	1,067	1,183	1,320	1,474	1,380	1,420	15,298
Appalachian No. 2	1,508	1,286	1,427	1,508	1,659	1,259	1,725	1,702	1,672	1,610	1,441	1,559	18,356
Indiana, Illinois, Kentucky, etc	23,679	21,406	24,366	21,345	21,486	21,523	24,132	25,063	24,225	24,216	23,472	25,116	280,029
Minnesota, Wisconsin, etc	1,974	1,726	1,881	1,665	1,195	1,867	1,868	1,919	1,584	1,845	1,762	1,966	21,252
Oklahoma, Kansas, etc	13,310	11,428	11,322	10,652	11,929	12,766	13,329	13,297	12,728	11,939	12,356	12,896	147,952
Texas Inland	6,402	5,744	6,810	6,494	6,552	6,745	6,751	6,670	6,346	6,752	6,633	6,213	78,112
Texas Gulf Coast	30,696	26,942	30,114	28,623	30,154	28,124	31,391	32,122	23,798	30,399	29,932	30,420	352,715
Louiaiana Gulf Coast	11,465	10,023	10,924	10,091	12,108	10,715	11,469	11,493	10,941	11,338	11,359	11,691	133,617
Arkansas, Louisiana Inland, etc	2,133	1,902	2,151	1,862	2,151	1,918	1,999	2,106	2,012	1,913	2,027	2,151	24,325
New Mexico	332	351	359	412	387	410	418	431	468	435	407	340	4,750
Rocky Mountain	4,284	3,748	3,994	3,716	4,327	4,198	4,199	4,338	4,185	3,900	4,065	4,483	49,437
West Coast	17,410	14,252	16,244	14,935	17,465	16,273	18,439	17,416	17,074	17,582	17,118	17,323	201,531
Total 1961	130,335	114,204	126,066	117,186	125,880	121,163	133,295	134,382	121,916	129,221	126,603	132,073	1,512,324
Natural-gas liquids used in other gasoline blends[3]	1,406	1,581	1,564	1,391	1,461	2,007	1,786	2,071	1,354	1,425	1,609	1,690	19,345
Total gasoline production	131,741	115,785	127,630	118,577	127,341	123,170	135,081	136,453	123,270	130,646	128,212	133,763	1,531,669

[1] Preliminary figures.

[2] Based on crude runs to stills and adjusted for net stocks of unfinished oils.

[3] This represents a net figure and includes exports.

TABLE 49.—Consumption, production, and distribution [1] of gasoline in 1961, by PAD districts

(Millions of barrels)

	PAD Districts					
	I	II	III	IV	V	Total
Consumption [2]	522.1	532.9	201.5	46.1	219.8	1,522.4
Supply:						
Production [3]	198.6	461.0	571.4	49.3	199.9	1,480.2
Imports	9.4	.1	.1	----------	1.0	10.6
Received from other districts:						
From District I	----------	18.0	.1	----------	----------	----------
From District II	10.1	----------	13.8	.2	----------	----------
From District III	331.5	84.5	----------	5.9	8.2	----------
From District IV	----------	3.0	----------	----------	7.9	----------
From District V	.3	----------	----------	.9	----------	----------
Total receipts	341.9	105.5	13.9	7.0	16.1	----------
Total supply	549.9	566.6	585.4	56.3	217.0	1,490.8
Stock change [4]	+2.5	+3.9	−2.7	−.2	−.5	+3.0
Shipped to other districts	18.1	24.1	430.1	10.9	1.2	----------
Exports	.6	.3	6.1	----------	1.9	8.9
Domestic demand	528.7	538.3	151.9	45.6	214.4	1,478.9
Difference between consumption and demand	−6.6	−5.4	+49.6	+.5	+5.4	+43.5

[1] Apparent distribution of gasoline by districts is based on actual data on tidewater and river shipments compiled by the Geological Survey, U.S. Department of the Interior. An estimate of annual interdistrict railroad shipments was computed from January–September 1961; data compiled by the Bureau of Transport Economics, Interstate Commerce Commission and records compiled by the San Francisco Office of the Bureau of Mines. Interdistrict pipeline shipments are compiled by the Bureau of Mines. Information on shipments moving from PAD District II by way of the Great Lakes ports and the Ohio River to PAD District I were compiled from data supplied by the Corps of U.S. Army Engineers.

[2] Compiled by the American Petroleum Institute.

[3] Excludes naptha and unfinished gasoline production and gasoline blended at terminal facilities.

[4] Includes only finished gasoline stocks.

TABLE 50.—Production (refinery output) and consumption of gasoline in the United States, by States

(Thousand barrels)

	1959		1960		1961 [1]	
	Production	Consumption [2]	Production	Consumption [2]	Production	Consumption [2]
Alabama	(3)	23,677	(3)	24,273	(3)	24,810
Alaska	------------	1,924	------------	1,907	------------	1,832
Arizona	------------	11,642	------------	12,500	------------	12,828
Arkansas	9,181	14,145	12,635	14,470	12,653	15,107
California	[4] 190,924	141,537	[4] 195,498	143,253	[4] 201,531	149,385
Colorado	6,016	16,983	6,205	17,204	6,723	17,664
Connecticut	------------	18,271	------------	18,808	------------	19,397
Delaware	(5)	4,853	(5)	4,844	(5)	5,075
District of Columbia	------------	4,934	------------	4,830	------------	4,885
Florida	------------	44,754	------------	45,488	------------	46,070
Georgia	------------	30,907	(6)	31,731	(6)	32,223
Hawaii	------------	4,278	(4)	5,244	(4)	5,741
Idaho	------------	6,681	------------	6,760	------------	7,018
Illinois	107,604	72,221	114,638	73,591	113,929	73,835
Indiana	72,919	42,777	70,825	43,529	73,099	43,374
Iowa	------------	28,378	------------	28,837	------------	28,863
Kansas	59,131	25,197	61,669	25,800	63,334	26,231
Kentucky	[7] 16,975	21,643	[7] 16,860	21,874	[7] 15,221	22,237
Louisiana	[3] 141,751	22,987	[3] 141,719	22,940	[3] 145,289	23,296
Maine	------------	7,909	------------	8,198	------------	8,321
Maryland	(6)	21,505	(6)	22,255	(6)	22,861
Massachusetts	[5] 27,258	33,935	[5] 25,631	34,790	[5] 27,581	35,523
Michigan	19,908	63,610	21,240	65,735	21,150	65,620
Minnesota	9,021	31,618	10,693	32,916	11,452	32,702
Mississippi	(3)	15,789	(3)	15,912	(3)	16,185
Missouri	[8] 11,099	41,271	[8] 12,276	41,864	[8] 11,673	41,775
Montana	10,452	7,302	10,539	7,513	10,323	7,930
Nebraska	(8)	14,720	(8)	14,969	(8)	15,004
Nevada	------------	3,588	------------	3,793	------------	4,078
New Hampshire	------------	4,830	------------	4,986	------------	4,977
New Jersey	61,328	47,802	66,508	48,814	66,288	49,159
New Mexico	4,728	10,295	4,536	9,637	4,750	9,728
New York	13,011	97,949	12,259	102,848	12,981	106,724
North Carolina	------------	34,805	------------	35,387	------------	37,628
North Dakota	[9] 9,264	7,280	[9] 10,373	7,942	[9] 9,800	7,561
Ohio	76,977	77,424	74,135	77,702	74,986	77,602
Oklahoma	73,590	26,008	72,634	27,025	72,945	26,848
Oregon	------------	16,065	------------	16,380	------------	17,072
Pennsylvania	93,109	77,571	90,626	78,589	86,139	77,653
Rhode Island	(5)	5,924	(5)	5,931	(5)	6,017
South Carolina	(6)	17,400	(6)	17,674	(6)	18,018
South Dakota	------------	8,276	------------	8,474	------------	8,581
Tennessee	(7)	28,279	(7)	29,075	(7)	29,871
Texas	419,042	109,275	437,812	107,938	430,827	112,366
Utah	15,068	8,203	15,541	8,520	15,546	9,144
Vermont	------------	3,127	------------	3,236	------------	3,273
Virginia	[6] 6,621	31,484	[6] 7,109	31,776	[6] 6,550	31,893
Washington	(4)	27,200	(4)	28,472	(4)	28,879
West Virginia	833	12,560	817	12,192	709	12,431
Wisconsin	(9)	31,529	(9)	32,690	(9)	32,753
Wyoming	17,620	4,262	17,356	4,405	16,845	4,380
Total	1,473,430	1,466,584	1,510,134	1,495,521	1,512,324	1,522,428

---

[1] Preliminary figures.
[2] American Petroleum Institute.
[3] Alabama and Mississippi included with Louisiana.
[4] Washington and Hawaii included with California.
[5] Delaware and Rhode Island included with Massachusetts.
[6] Maryland, South Carolina, and Georgia (1960-61) included with Virginia.
[7] Tennessee included with Kentucky.
[8] Nebraska include with Missouri.
[9] Wisconsin included with North Dakota.

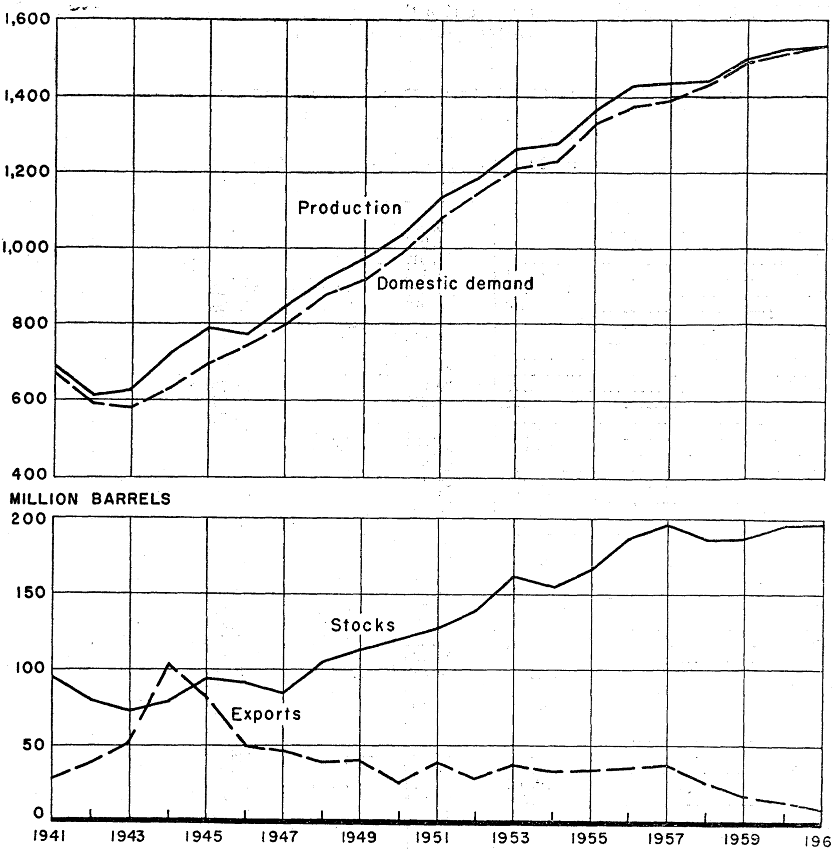

FIGURE 7.—Production, domestic demand, exports, and stocks of gasoline in the United States, 1941–61

TABLE 51.—Transportation of petroleum products by pipeline, by months

(Thousands of barrels)

Item	January	February	March	April	May	June	July	August	September	October	November	December	Total
1960:													
Turned into lines: [1]													
Gasoline	55,244	53,808	56,941	60,339	62,063	65,218	62,999	62,058	58,401	60,034	58,155	57,607	712,867
Kerosine	6,111	4,663	5,103	3,937	2,902	3,757	3,216	3,884	4,507	4,948	5,117	6,777	54,922
Distillate fuel oil	26,845	20,449	22,459	15,345	14,566	16,055	16,665	17,962	16,187	17,803	20,542	27,343	232,221
Natural-gas liquids	5,390	4,338	4,809	3,816	3,663	3,451	3,665	3,768	4,182	4,532	5,127	6,314	53,055
Delivered from lines: [1]													
Gasoline	55,275	51,240	55,908	60,133	62,538	65,172	63,057	63,411	58,869	59,989	58,406	57,958	711,956
Kerosine	5,898	4,879	5,261	3,840	2,736	3,576	3,080	3,678	3,846	4,904	5,040	6,444	53,182
Distillate fuel oil	28,424	22,995	25,540	16,082	13,310	14,252	14,773	15,144	16,159	16,995	20,666	28,513	232,853
Natural-gas liguids	4,984	4,504	4,809	4,016	3,661	3,505	3,600	3,670	3,533	4,135	4,480	5,807	50,704
Shortage (overage): [2]													
Gasoline	(103)	(18)	102	(38)	138	17	100	63	75	65	49	3	453
Kerosine	115	128	88	127	72	75	94	101	73	127	138	124	1,262
Distillate fuel oil	60	(57)	(193)	(2)	(22)	(20)	35	(23)	(1)	(13)	(38)	(48)	(322)
Natural-gas liquids	52	28	35	20	17	20	28	23	33	30	40	94	420
Stocks in lines and working tanks at end of month:													
Gasoline	22,867	25,453	26,384	26,628	26,015	26,044	25,886	24,470	23,927	23,907	23,607	23,253	23,253
Kerosine	2,435	2,091	1,845	1,815	1,909	2,015	2,057	2,162	2,750	2,667	2,606	2,815	2,815
Distillate fuel oil	15,236	12,747	9,859	9,124	10,402	12,225	14,082	16,923	16,952	17,773	17,687	16,565	16,565
Natural-gas liquids	2,070	1,876	1,841	1,621	1,606	1,532	1,569	1,644	2,260	2,627	3,234	3,647	3,647
1961:													
Turned into lines: [1]													
Gasoline	58,847	50,149	56,120	59,975	63,645	63,510	64,761	63,599	60,964	61,673	59,960	67,741	730,944
Kerosine	8,072	6,094	4,739	4,070	3,926	4,160	4,106	4,649	5,473	5,849	6,220	8,441	65,799
Distillate fuel oil	28,695	24,963	16,981	14,396	15,452	17,245	16,686	17,776	17,474	19,065	21,623	27,133	237,489
Jet fuel	2,261	2,247	2,799	2,502	2,752	2,609	2,972	2,882	2,174	2,415	2,553	2,186	30,352
Natural-gas liquids	7,198	5,943	5,793	5,820	6,395	6,307	6,024	6,938	6,330	7,298	8,618	9,669	82,333
Delivered from lines: [1]													
Gasoline	56,625	49,777	55,044	59,228	64,229	64,344	64,569	65,219	61,288	62,127	60,552	60,396	723,398
Kerosine	7,782	6,477	4,921	3,835	4,300	3,688	3,959	4,290	5,486	5,852	5,891	8,314	64,795
Distillate fuel oil	31,686	26,281	18,438	15,445	14,201	15,698	15,860	15,621	16,185	18,577	20,986	29,448	238,426
Jet fuel oil	2,265	2,214	2,736	2,418	2,915	2,426	2,962	2,798	2,369	2,311	2,465	2,165	30,044
Natural-gas liquids	7,251	6,095	5,911	5,756	6,147	5,739	5,615	6,488	6,089	7,171	8,176	9,234	79,672
Shortage (overage): [2]													
Gasoline	(47)	(8)	10	41	96	(1)	69	(54)	15	74	91	(60)	226
Kerosine	141	126	114	75	88	76	62	89	82	(22)	72	70	973
Distillate fuel oil	23	(54)	(47)	(6)	(7)	(6)	(33)	52	(81)	158	(15)	31	15
Jet fuel	5	3	8	6	(37)	48	7	---------	9	4	8	1	62
Natural-gas liquids	60	(14)	54	32	14	6	3	47	41	36	91	33	403
Stocks in lines and working tanks at end of month:													
Gasoline	25,522	25,902	26,968	27,674	26,994	26,161	26,284	24,718	24,379	23,851	23,168	24,573	24,573
Kerosine	2,964	2,455	2,159	2,319	1,857	2,253	2,338	2,608	2,513	2,532	2,789	2,846	2,846
Distillate fuel oil	13,551	12,287	10,877	9,834	11,092	12,645	13,504	15,607	16,977	17,307	17,959	15,613	15,613
Jet fuel	405	435	490	568	442	577	580	664	460	560	640	660	660
Natural-gas liquids	3.534	3,396	3,224	3,256	3,490	4,052	4,458	2,809	3,009	3,100	3,451	3,853	3,853

[1] The quantities "Turned into lines" and "Delivered from lines" are on a net basis, eliminating intersystem transfers.

[2] Figures in parentheses represent overage.

TABLE 52.—Transportation of petroleum products by pipeline between PAD districts in the United States by months

(Thousands of barrels)

	January	February	March	April	May	June	July	August	September	October	November	December	Total
1960:													
From District 1 to District 2:													
Gasoline	1, 593	1, 579	1, 597	1, 779	1, 872	2, 002	1, 822	2, 226	1, 839	2, 059	1, 931	1, 963	22, 262
Kerosine	126	75	109	66	53	21	33	47	104	90	116	141	981
Distillate fuel oil	299	205	324	287	234	203	269	293	298	246	329	329	3, 316
From District 2 to District 1:													
Gasoline	468	391	505	452	427	385	413	448	402	433	490	411	5, 225
From District 2 to District 3:													
Gasoline	1, 004	928	912	994	1, 018	1, 272	1, 075	1, 039	1, 088	1, 008	981	1, 138	12, 457
Distillate fuel oil	360	230	105	159	209	169	327	464	406	468	376	552	3, 825
From District 3 to District 1:													
Gasoline	4, 726	4, 860	4, 860	4, 911	5, 432	5, 097	5, 702	5, 438	5, 302	5, 378	5, 242	5, 306	62, 254
Kerosine	1, 163	1, 032	1, 054	757	315	461	628	990	855	1, 064	1, 143	1, 214	10, 676
Distillate fuel oil	1, 883	1, 489	1, 613	1, 324	1, 071	957	1, 213	1, 597	1, 508	1, 067	1, 310	1, 674	16, 706
From District 3 to District 2:													
Gasoline	2, 514	2, 841	3, 134	3, 328	3, 553	3, 656	3, 268	3, 450	3, 129	3, 469	3, 450	3, 648	39, 440
Kerosine	67	153	53	109	65	186	170	117	82	80	69	255	1, 406
Distillate fuel oil	1, 540	537	814	764	609	832	1, 107	1, 032	911	793	708	823	10, 470
Natural-gas liquids	1, 401	1, 140	1, 329	622	461	374	491	741	942	1, 254	1, 248	2, 787	12, 790
From District 3 to District 4:													
Gasoline	385	382	415	437	435	507	556	572	520	481	488	462	5, 640
Kerosine	49	55	57	43	51	45	66	62	75	89	97	104	793
Distillate fuel oil	85	57	67	74	71	55	59	64	70	66	80	90	838
Natural-gas liquids	137	120	97	18	15	13	13	50	38	44	86	121	752
From District 3 to District 5:													
Gasoline	543	527	630	534	566	558	542	621	498	420	548	630	6, 617
Kerosine	1	1	1	1	1	1	1	1	1	16	1	2	28
Distillate fuel oil	63	67	91	83	84	111	129	100	101	94	111	97	1, 131
From District 4 to District 2:													
Gasoline	95	129	91	123	195	167	190	182	141	123	113	130	1, 679
Kerosine	3	4	6	4	4	3	3	4	3	3	3	3	43
Distillate fuel oil	43	35	54	89	45	58	47	43	40	53	48	40	595
From District 4 to District 5:													
Gasoline	554	480	473	522	622	519	472	552	451	539	436	486	6, 106
Distillate fuel oil	448	350	379	247	271	287	261	348	344	298	304	330	3, 867
1961:													
From District 1 to District 2:													
Gasoline	1, 247	1, 227	1, 268	1, 517	1, 457	1, 530	1, 445	1, 614	1, 619	1, 616	1, 501	1, 668	17, 709
Kerosine	141	119	115	22	30	17	57	37	73	111	88	139	949
Distillate fuel oil	250	168	256	216	206	212	287	281	228	259	250	299	2, 912
Jet fuel	--------	--------	15	--------	15	50	--------	--------	--------	--------	--------	--------	80
From District 2 to District 1:													
Gasoline	386	349	504	407	471	453	768	477	440	518	467	448	5, 688

From District 2 to District 3:													
Gasoline	915	627	905	1,339	1,276	1,222	1,026	1,028	1,269	1,286	1,199	1,138	13,230
Distillate fuel oil	647	648	324	199	305	227	373	643	369	469	333	558	5,095
Jet fuel	154	140	224	121	187	197	156	142	85	--------	104	125	1,635
From District 3 to District 1:													
Gasoline	4,941	3.976	5,419	7,333	7,234	7,382	7,737	7,645	7,063	7,690	7,571	7,076	81,067
Kerosine	1,495	1,509	1,070	262	322	289	681	832	1,358	1,064	1,044	1,318	11,244
Distillate fuel oil	1,839	1,693	1,826	996	1,079	1,667	1,774	1,494	1,673	1,768	1,766	2,151	19,726
Jet fuel	110	75	100	130	329	200	210	225	231	119	178	158	2,065
From District 3 to District 2:													
Gasoline	2,661	2,696	3,271	3,183	4,295	4,114	3,902	3,362	3,727	3,401	3,436	3,592	41,640
Kerosine	219	218	178	45	204	137	70	66	35	49	216	333	1,770
Distillate fuel oil	1,050	665	513	631	718	909	593	831	710	911	760	1,008	9,299
Jet fuel	--------	--------	31	52	66	54	52	41	9	39	--------	--------	344
Natural-gas liquids	2,598	2,009	1,065	1,116	928	1,211	1,019	1,697	1,757	1,901	3,019	3,720	22,040
From District 3 to District 4:													
Gasoline	440	407	447	448	458	543	576	562	523	515	489	474	5,882
Kerosine	130	100	92	105	98	114	118	116	127	137	129	150	1,416
Distillate fuel oil	71	70	59	63	68	66	75	65	78	79	62	83	839
Jet fuel	34	41	50	34	34	17	--------	33	25	26	34	47	375
Natural-gas liquids	106	75	45	31	15	11	16	54	46	37	87	128	651
From District 3 to District 5:													
Gasoline	618	487	582	510	550	526	586	559	530	455	571	581	6,555
Kerosine	6	24	26	36	23	23	12	17	18	18	35	28	266
Distillate fuel oil	147	119	113	140	109	136	122	136	112	157	139	146	1,576
Jet fuel	207	211	228	166	209	165	271	188	--------	261	190	205	2,301
From District 4 to District 2:													
Gasoline	122	104	122	252	271	231	301	293	201	173	189	181	2,440
Kerosine	3	3	6	7	7	--------	--------	2	--------	3	2	4	37
Distillate fuel oil	42	45	50	108	115	67	54	75	68	131	95	90	940
From District 4 to District 5:													
Gasoline	400	425	425	519	546	549	465	535	564	476	407	451	5,762
Distillate fuel oil	475	362	281	205	201	230	258	180	249	364	303	410	3,518
Jet fuel	137	167	85	35	75	52	107	135	195	212	137	72	1,409

TABLE 53.—Stocks of gasoline in the United States in 1961, by districts and months

(Thousand barrels)

	Jan. 31	Feb. 28	Mar. 31	Apr. 30	May 31	June 30	July 31	Aug. 31	Sept. 30	Oct. 31	Nov. 30	Dec. 31
Finished gasoline: [1]												
East Coast	42,659	44,662	46,387	47,375	47,050	41,861	44,025	44,528	42,914	42,110	42,166	42,873
Appalachian No. 1	5,593	5,742	5,510	5,920	6,027	5,755	5,205	4,902	5,055	5,396	5,317	5,701
Appalachian No. 2	3,167	3,208	2,908	3,266	3,263	2,601	2,792	2,719	3,161	3,313	2,883	2,940
Indiana, Illinois, Kentucky, etc	34,456	36,595	39,104	39,783	35,352	31,328	30,606	30,555	30,391	30,022	29,682	33,449
Minnesota, Wisconsin, North Dakota, and South Dakota	7,032	7,142	7,106	7,210	6,811	7,143	7,221	6,752	6,806	6,734	7,147	7,275
Oklahoma, Kansas, etc	18,582	20,642	21,206	19,989	17,933	16,650	16,936	16,881	17,096	15,281	15,764	16,622
Texas Inland	7,155	7,888	8,031	8,169	7,449	6,774	6,648	6,374	6,182	6,723	6,522	6,634
Texas Gulf Coast	27,869	29,853	27,531	26,304	24,693	24,415	23,896	21,917	18,649	20,440	20,129	21,829
Louisiana Gulf Coast	11,755	11,948	11,762	10,926	10,880	10,182	9,606	9,351	9,368	9,552	8,872	9,743
Arkansas, Louisiana Inland, etc	6,177	6,428	6,360	7,059	6,451	6,561	6,172	6,688	5,383	6,247	6,208	6,508
New Mexico	798	839	769	821	780	700	703	585	653	643	719	667
Rocky Mountain	6,978	7,566	7,766	7,536	7,619	6,998	6,205	5,259	5,148	4,873	5,144	5,936
West Coast	25,653	26,246	25,022	24,016	24,598	22,775	22,502	22,025	22,466	22,549	23,462	23,990
Total finished gasoline	197,874	208,759	209,462	208,374	198,906	183,743	182,517	178,536	173,272	173,883	174,015	[2] 184,167
Unfinished gasoline:												
East Coast	1,906	1,471	2,153	2,621	2,341	1,951	1,675	2,149	1,590	1,721	1,881	1,574
Appalachian No. 1	161	153	160	142	140	136	162	179	138	139	142	154
Appalachian No. 2	68	46	38	25	35	53	92	79	67	55	43	71
Indiana, Illinois, Kentucky, etc	1,897	2,280	2,402	2,543	2,621	2,259	1,975	1,663	1,781	1,968	1,948	1,750
Minnesota, Wisconsin, North Dakota, and South Dakota	9	9	2	2	11	3	1	2	4	1	1	1
Oklahoma, Kansas, etc	871	777	742	723	952	710	676	610	533	771	625	749
Texas Inland	267	278	297	321	327	274	318	302	281	591	369	397
Texas Gulf Coast	4,878	4,718	4,471	4,237	4,512	4,931	4,460	4,702	4,257	4,480	4,798	4,007
Louisiana Gulf Coast	209	217	237	228	233	241	236	303	266	247	276	229
Arkansas, Louisiana Inland, etc	117	94	107	99	108	81	81	113	115	131	112	90
New Mexico	12	12	12	12	11	11	11	10	10	10	14	14
Rocky Mountain	192	202	244	193	232	209	157	224	201	207	159	165
West Coast	3,406	3,173	3,333	3,004	2,970	3,038	3,499	2,725	2,484	2,801	2,467	2,462
Total unfinished gasoline	13,993	13,430	14,198	14,150	14,493	13,897	13,343	13,061	11,727	13,122	12,835	11,663
Total finished and unfinished gasoline:												
East Coast	44,565	46,133	48,540	49,996	49,391	43,812	45,700	46,677	44,504	43,831	44,047	44,447
Appalachian No. 1	5,754	5,895	5,670	6,062	6,167	5,891	5,367	5,081	5,193	5,535	5,459	5,855
Appalachian No. 2	3,235	3,254	2,946	3,291	3,298	2,654	2,884	2,798	3,228	3,368	2,926	3,011
Indiana, Illinois, Kentucky, etc	36,353	38,875	41,506	42,326	37,973	33,587	32,581	32,218	32,172	31,990	31,630	35,199
Minnesota, Wisconsin, North Dakota, and South Dakota	7,041	7,151	7,108	7,212	6,822	7,146	7,222	6,754	6,810	6,735	7,148	7,276
Oklahoma, Kansas, etc	19,453	21,419	21,948	20,712	18,885	17,360	17,612	17,491	17,629	16,052	16,389	17,371

Texas Inland	7,422	8,166	8,328	8,490	7,776	7,048	6,966	6,676	6,463	7,314	6,891	7,031
Texas Gulf Coast	32,747	34,571	32,002	30,541	29,205	29,346	28,356	26,619	22,906	24,920	24,927	25,836
Louisiana Gulf Coast	11,964	12,165	11,999	11,154	11,113	10,423	9,842	9,654	9,634	9,799	9,148	9,972
Arkansas, Louisiana Inland, etc	6,294	6,522	6,467	7,158	6,559	6,642	6,253	6,801	5,498	6,378	6,320	6,598
New Mexico	810	851	781	833	791	711	714	595	663	653	733	681
Rocky Mountain	7,170	7,768	8,010	7,729	7,851	7,207	6,362	5,483	5,349	5,080	5,303	6,101
West Coast	29,059	29,419	28,355	27,020	27,568	25,813	26,001	24,750	24,950	25,350	25,929	26,452
Total: 1961	211,867	222,189	223,660	222,524	213,399	197,640	195,860	191,597	184,999	187,005	186,850	195,830
1960	205,982	217,139	222,691	216,100	210,509	198,452	196,021	190,322	189,645	189,674	188,726	194,774

---

[1] Includes stocks of finished gasoline at refineries and bulk terminals and in pipelines.

[2] Includes 5,137,000 barrels of naphtha.

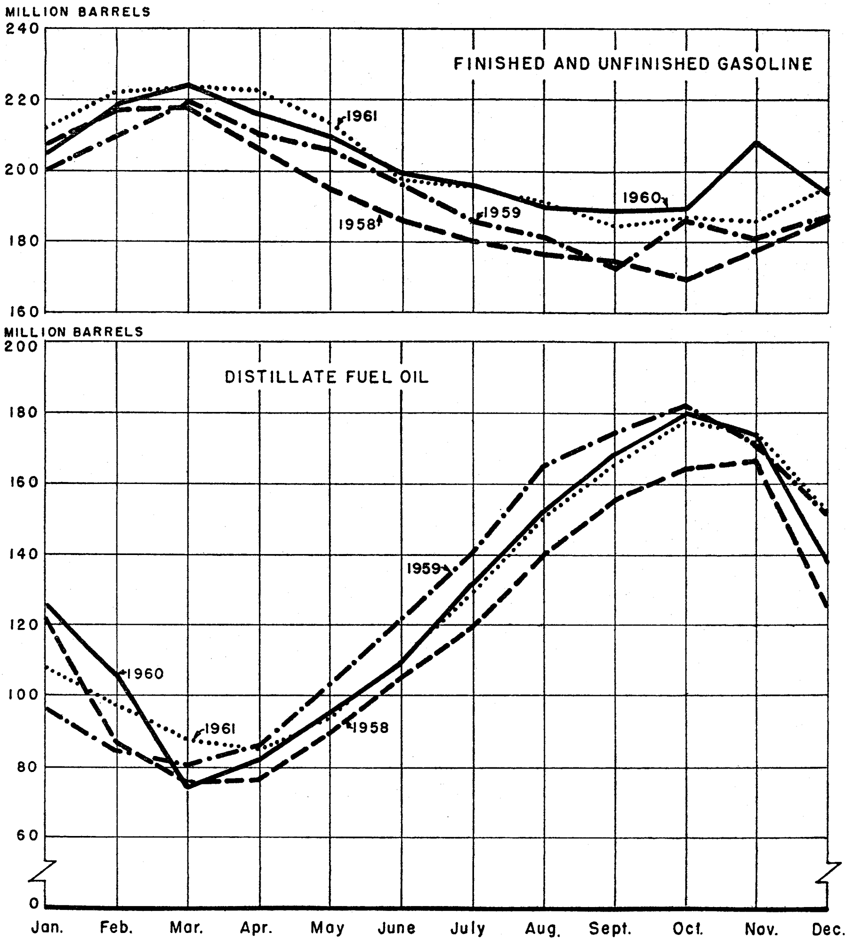

FIGURE 8.—Stocks of finished and unfinished gasoline and stocks of distillate fuel oil in the United States, 1958–61, by months.

TABLE 54.—Day's supply of gasoline on hand in the United States at end of month [1]

	1959	1960	1961 [2]		1959	1960	1961 [2]
January	54.8	54.4	55.9	July	42.7	43.8	43.0
February	54.2	55.6	54.2	August	41.3	44.3	43.9
March	51.5	51.4	55.8	September	44.0	46.2	47.6
April	50.5	51.2	50.1	October	44.5	45.3	43.4
May	45.5	45.3	45.9	November	44.8	46.6	45.9
June	43.6	45.2	44.4	December	51.8	52.3	49.8

[1] Stocks divided by daily average total demand (domestic demand plus exports) for succeeding month

[2] Preliminary figures.

TABLE 55.—Average monthly prices of gasoline in the United States

(Cents per gallon)

Monthly average	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average for year
1960:													
At refineries in Oklahoma, regular, 91 octane	11.15	11.34	11.82	12.00	11.60	12.17	12.73	13.30	13.38	13.38	13.38	13.38	12.47
Of 55 cities on 1st of month:													
Dealer's net (excluding tax)	15.72	15.46	15.61	15.37	15.82	15.74	16.14	16.72	16.65	16.60	16.54	16.54	16.08
Service station (including State, local, and Federal taxes)	30.78	30.38	30.32	30.33	30.83	30.92	31.30	31.90	31.92	31.70	31.46	31.66	31.13
1961:													
At refineries in Oklahoma, regular, 91 octane	13.38	13.38	13.38	13.38	12.99	13.13	13.13	12.92	11.88	11.88	12.00	12.22	12.80
Of 55 cities on 1st of month:													
Dealer's net (excluding tax)	16.51	16.22	16.22	15.59	15.51	15.84	15.98	16.41	15.83	15.05	15.40	15.00	15.80
Service station (including State, local, and Federal taxes)	31.60	31.26	31.25	30.33	30.42	30.50	30.82	31.60	30.85	30.12	30.37	30.03	30.76

Source: Platt's Oil Price Handbook and Platt's Oilgram Price Service.

KEROSINE

The total demand for kerosine increased 7.8 percent in 1961 to 143.6 million barrels. Exports declined 66.6 percent, and domestic demand was 143.4 million barrels, a gain of 8.2 percent. Shipments of kerosine for use as fuel in commercial jet aircraft increased from 33.2 million barrels in 1960 to 47.2 million in 1961 while the other uses of kerosine declined 3.2 percent. In November 1960 some companies began importing kerosine in bond (duty free) for use as jet fuel for aircraft engaged in overseas flights. Such fuel is exempt from the regulations of the Oil Imports Administration. These imports which totaled 68 thousand barrels in 1960 increased to 1.9 million barrels in 1961.

Kerosine deliveries by pipeline in 1961 total 64.8 million barrels, 11.6 million barrels higher than the preceding year. Waterborne shipments of kerosine in 1961 were less than in the previous year. The decline was in the barge movement from the gulf coast to destinations on the inland waterways.

Tanker rates for kerosine from the gulf coast to U.S. destinations north of Cape Hatteras increased from 35.3 cents per barrel in 1960 to 41.2 cents in 1961.

The average posted prices of kerosine at Oklahoma refineries in 1961 was 10.71 cents per gallon, an increase of 0.36 cent for the year. The posted price on barges in New York Harbor increased from an average of 10.18 cents per gallon in 1960 to 11.06 cents per gallon in 1961.

TABLE 56.—Salient statistics of kerosine in the United States, by months and districts

(Thousand barrels unless otherwise stated)

Month and district	Production	Yield (percent)	Transfers from gasoline plants	Imports	Exports	Stocks (end of period)	Domestic demand
	1960						
Month:							
January	13,547	5.3	99	---------	157	26,510	14,702
February	10,408	4.5	110	---------	43	23,020	13,965
March	11,353	4.5	101	---------	78	18,440	15,956
April	9,745	4.1	65	---------	72	20,547	7,631
May	9,853	4.0	69	---------	38	24,217	6,214
June	9,759	3.9	62	---------	21	27,354	6,663
July	11,164	4.3	74	---------	25	30,499	8,068
August	11,397	4.4	73	---------	156	33,379	8,434
September	10,776	4.3	106	---------	7	35,408	8,846
October	11,993	4.9	69	---------	19	36,977	10,474
November	12,401	5.1	92	39	11	36,722	12,776
December	13,376	5.2	150	29	62	31,445	18,770
Total	135,772	4.6	1,070	68	689	31,445	132,499
District:							
East Coast	12,893	2.9	---------	68	69	12,102	(3)
Appalachian No. 1	1,288	3.6	---------	---------		743	
Appalachian No. 2	1,907	5.1	---------	---------	49	444	
Indiana, Illinois, Kentucky, etc	27,143	5.0	---------	---------		6,256	
Minnesota, Wisconsin, North Dakota, etc	1,958	4.4	---------	---------		1,206	
Oklahoma, Kansas, etc	5,155	1.9	---------	---------		1,304	
Texas Inland	3,392	3.1	498	---------		592	
Texas Gulf Coast	44,455	6.6	205	---------	449	3,358	
Louisiana Gulf Coast	22,172	9.0	133	---------		2,228	
Arkansas, Louisiana Inland, etc	2,078	5.2	208	---------		1,219	
New Mexico	120	1.4	26	---------		46	
Rocky Mountain	1,169	1.1	---------	---------		318	
West Coast	12,042	2.8	---------	---------	122	1,629	
Total	135,772	4.6	1,070	68	689	31,445	132,499

Month and district	Production	Yield (percent)	Transfers from gasoline plants	Imports	Exports	Stocks (end of period)	Domestic demand	Shipments for commercial jet aircraft [1]	
	1961 [2]							1960	1961
Month:									
January	13,857	5.3	155	80	38	27,365	18,134	1,898	3,324
February	12,040	5.0	143	56	22	24,471	15,111	2,078	2,585
March	12,679	5.1	98	101	30	25,666	11,653	2,174	3,639
April	10,555	4.6	73	94	20	27,348	9,020	2,351	3,389
May	9,921	4.0	77	235	18	28,384	9,179	2,952	3,881
June	9,466	4.0	57	217	15	30,305	7,804	2,854	4,082
July	11,125	4.3	76	151	4	32,440	9,213	2,960	4,329
August	11,325	4.3	114	210	24	33,929	10,136	3,020	4,458
September	11,259	4.6	95	160	11	35,911	9,521	3,159	4,270
October	13,134	5.1	118	166	16	37,257	12,056	3,272	4,441
November	12,450	5.0	119	224	17	36,224	13,809	3,257	4,398
December	13,599	5.1	155	228	15	32,433	17,758	3,184	4,391
Total	141,410	4.7	1,280	1,922	230	32,433	143,394	33,159	47,187
District:									
East Coast	12,911	2.9	--------	1,751	97	12,936	(3)	23,491	32,342
Appalachian No. 1	1,396	3.8	--------	--------		785			
Appalachian No. 2	1,992	5.5	--------	--------	7	405			
Indiana, Illinois, Kentucky, etc	27,256	5.0	--------	--------		6,133			
Minnesota, Wisconsin, North Dakota, etc	2,019	4.5	--------	--------		1,456			
Oklahoma, Kansas, etc	5,937	2.3	--------	--------		1,504			
Texas Inland	4,034	3.6	436	--------	78	745			
Texas Gulf Coast	43,746	6.6	107	--------		2,977			
Louisiana Gulf Coast	22,847	8.9	303	--------		2,230			
Arkansas, Louisiana Inland, etc	1,573	3.8	409	--------		822			
New Mexico	172	1.9	25	--------		49			
Rocky Mountain	1,616	1.5	--------	--------		449			
West Coast	15,911	3.5	--------	171	48	1,942		9,668	14,845
Total	141,410	4.7	1,280	1,922	230	32,433	143,394	33,159	47,187

[1] Included in total demand for kerosine. Preliminary data. [3] Not available

TABLE 57.—Shipments of kerosine in the United States by PAD districts, States and uses

(Thousand barrels)

District and State	Range oil		Tractor fuel		All other uses		Total	
	1960	1961	1960	1961	1960	1961	1960	1961
District 1:								
Connecticut	1,624	1,348	--------	9	286	391	1,910	1,748
Delaware	922	722	6	6	36	81	964	809
District of Columbia	134	116	3	3	24	12	161	131
Florida	3,360	2,961	24	28	571	372	3,955	3,361
Georgia	1,001	911	130	85	420	343	1,551	1,339
Maine	2,218	2,477	10	--------	62	65	2,290	2,542
Maryland	2,327	2,401	30	39	83	118	2,440	2,558
Massachusetts	5,409	4,692	3	4	295	228	5,707	4,924
New Hampshire	831	822	7	--------	3	3	841	825
New Jersey	2,109	2,089	1	5	353	193	2,463	2,287
New York	4,833	5,381	25	3	434	522	5,292	5,906
North Carolina	10,825	10,856	24	37	1,219	1,016	12,068	11,909
Pennsylvania	3,134	2,807	34	12	333	403	3,501	3,222
Rhode Island	869	743	13	2	2	10	884	755
South Carolina	3,718	3,479	18	8	744	491	4,480	3,978
Vermont	803	866	1	--------	13	45	817	911
Virginia	4,844	4,775	23	21	162	141	5,029	4,937
West Virginia	163	190	3	3	109	53	275	246
Total	49,124	47,636	355	265	5,149	4,487	54,628	52,388
District 2:								
Illinois	3,563	3,923	26	20	1,770	1,064	5,359	5,007
Indiana	3,785	3,313	--------	8	107	355	3,892	3,676
Iowa	2,390	2,159	22	27	170	117	2,582	2,303
Kansas	395	435	29	23	271	70	695	528
Kentucky	1,207	935	5	2	370	278	1,582	1,215
Michigan	2,790	4,130	5	56	1,269	1,972	4,064	6,158
Minnesota	2,320	1,905	23	38	222	48	2,565	1,991
Missouri	1,802	1,321	27	9	254	136	2,083	1,466
Nebraska	479	448	14	43	183	118	676	609
North Dakota	858	811	2	--------	42	15	902	826
Ohio	2,768	1,890	25	--------	1,155	598	3,948	2,488
Oklahoma	199	177	44	70	187	132	430	379
South Dakota	901	825	8	2	64	36	973	863
Tennessee	1,287	1,132	50	10	1,282	691	2,619	1,833
Wisconsin	2,168	2,895	3	6	787	70	2,958	2,971
Total	26,912	26,299	283	314	8,133	5,700	35,328	32,313
District 3:								
Alabama	595	1,060	68	22	381	306	1,044	1,388
Arkansas	209	279	99	76	256	161	564	516
Louisiana	235	323	139	40	551	753	925	1,116
Mississippi	68	193	31	62	298	348	397	603
New Mexico	235	212	33	27	216	289	484	528
Texas	743	903	288	268	2,354	2,655	3,385	3,826
Total	2,085	2,970	658	495	4,056	4,512	6,799	7,977
District 4:								
Colorado	165	175	10	7	101	48	276	230
Idaho	102	393	--------	--------	5	3	107	396
Montana	465	300	--------	--------	11	59	476	359
Utah	16	192	--------	--------	20	16	36	208
Wyoming	43	102	--------	--------	48	13	91	115
Total	791	1,162	10	7	185	139	986	1,308
District 5:								
Alaska	--------	9	1	--------	89	32	90	41
Arizona	--------	16	--------	--------	64	20	64	36
California	76	252	--------	--------	939	809	1,015	1,061
Hawaii	23	42	--------	--------	68	26	91	68
Nevada	--------	3	--------	--------	3	--------	3	3
Oregon	1	8	--------	--------	44	18	45	26
Washington	--------	10	--------	--------	105	38	105	48
Total	100	340	1	--------	1,312	943	1,413	1,283
Total United States	79,012	78,407	1,307	1,081	18,835	15,781	99,154	95,269

TABLE 58.—Monthly average prices of kerosine in the United States in cents per gallon

Year and grade	January	February	March	April	May	June	July
1960:							
42°-44° gravity, water-white kerosine at refineries, Oklahoma	10.72	10.35	10.03	9.71	9.69	9.69	9.90
Kerosine (and/or No. 1 fuel oil) at New York Harbor	11.21	11.05	10.50	10.50	10.50	10.41	10.50
Kerosine, tank-wagon at Chicago	17.10	17.10	17.10	17.10	17.10	17.10	17.10
Kerosine, tank-wagon at New York City [1]	15.90	15.30	15.30	15.30	15.30	15.30	15.30
1961:							
42°-44° gravity, water-white kerosine at refineries, Oklahoma	11.31	11.30	10.97	10.81	10.53	10.44	10.44
Kerosine (and/or No. 1 fuel oil) at New York Harbor	11.44	11.89	11.96	11.50	11.02	11.00	11.04
Kerosine, tank-wagon at Chicago	17.10	17.60	17.60	17.10	17.10	16.60	16.60
Kerosine, tank-wagon at New York City [1]	16.40	16.90	16.40	16.40	16.40	16.40	16.70

Year and grade	August	September	October	November	December	Average for year
1960:						
42°-44° gravity, water-white kerosine at refineries, Oklahoma	10.55	10.81	10.81	10.81	11.12	10.35
Kerosine (and/or No. 1 fuel oil) at New York Harbor	10.50	10.50	10.50	10.22	10.66	10.54
Kerosine, tank-wagon at Chicago	17.10	17.10	17.10	17.10	17.10	17.10
Kerosine, tank-wagon at New York City [1]	15.30	15.60	15.60	15.30	15.90	15.45
1961:						
42°-44° gravity, water-white kerosine at refineries, Oklahoma	10.44	10.44	10.44	10.56	10.85	10.71
Kerosine (and/or No. 1 fuel oil) at New York Harbor	11.30	11.30	11.30	11.30	11.66	11.39
Kerosine, tank-wagon at Chicago	16.60	16.60	16.60	16.60	17.10	16.90
Kerosine, tank-wagon at New York City [1]	16.70	16.70	16.70	16.70	16.70	16.60

[1] Manhattan and Queens.

Source: Platts' Oil Price Handbook.

DISTILLATE FUEL OIL

Despite warmer than normal weather and a decline of almost 3 million barrels in exports, total demand for distillate fuel oil increased 4.9 million barrels in 1961 to 700.1 million barrels. Total demand in the first quarter was 2,657,000 barrels daily, 2.8 percent less than in 1960. Second and third quarter demands were well above the preceding year average, but the fourth quarter was below the same period of 1960 by 0.9 percent. The gain in domestic demand for the year was 1.1 percent.

The new supply of distillate fuel oil, which includes refinery production, production from natural-gas liquid plants, direct transfers from crude oil, and imports, exceeded demand in 1961 and resulted in the addition of 13.6 million barrels to stocks.

The annual average of posted prices for distillate fuel oil, as shown in Platt's Oil Price Handbook, was above the 1960 level at Oklahoma refineries and in New York Harbor. Prices quoted for diesel oil for use as ships bunkers averaged 37 cents per barrel higher in New York City for the year, 30 cents per barrel higher at New Orleans, but remained at the 1960 level at San Pedro, Calif.

TABLE 59.—Salient statistics of distillate fuel oil in the United States, by month and districts

(Thousand barrels unless otherwise stated)

Month and district	Production	Yield (percent)	Transfers		Imports	Exports	Stocks (end of period)	Domestic demand	Production	Yield (percent)	Transfers		Imports	Exports	Stocks (end of period)	Domestic demand
			From gasoline plants	From crude oil [1]							From gasoline plants	From crude oil [1]				
	1960								1961 [2]							
Month:																
January	59,874	23.2	92	173	1,590	791	125,924	86,178	64,433	24.7	102	81	2,096	708	108,097	96,362
February	51,877	22.2	69	81	1,095	1,012	105,015	73,019	63,248	26.4	56	79	1,054	329	97,298	74,907
March	55,690	22.4	71	78	887	983	73,948	86,810	55,967	22.4	49	77	1,355	445	87,950	66,351
April	52,300	21.9	73	78	1,520	778	81,755	45,386	49,861	21.6	69	68	891	563	85,003	53,273
May	53,841	22.1	77	72	1,342	1,160	95,461	40,466	52,868	21.4	47	66	743	822	93,636	44,269
June	53,338	21.7	75	70	1,148	1,171	109,174	39,747	52,503	22.1	43	61	993	699	109,513	37,024
July	56,773	22.0	64	72	796	983	131,044	34,852	58,234	22.3	42	66	1,528	580	129,631	39,172
August	58,081	22.4	69	79	773	761	152,158	37,127	61,208	22.9	44	70	1,123	359	150,893	40,824
September	54,928	22.2	196	73	1,005	482	168,235	39,643	54,571	22.5	37	71	1,422	346	165,445	41,203
October	56,262	22.9	277	69	897	579	180,071	45,090	59,898	23.4	41	69	1,177	749	177,921	47,960
November	54,877	22.8	305	74	621	558	173,913	61,477	59,508	23.9	40	69	1,364	602	174,192	64,108
December	59,209	23.2	266	82	1,097	639	138,455	95,473	63,716	24.1	37	74	2,411	746	152,018	87,666
Total	667,050	22.4	1,634	1,001	12,771	9,897	138,455	685,268	696,015	23.2	607	851	16,157	6,948	152,018	693,119
District:																
East Coast	120,615	27.3	--------	--------	11,365	282	50,870	(3)	125,142	28.3	--------	--------	14,313	170	61,278	(3)
Appalachian No. 1	7,936	22.4	--------	--------			3,730		8,551	23.2	--------	--------			3,857	
Appalachian No. 2	6,892	18.6	--------	--------	12	1,150	1,517		6,824	18.9	--------	--------	24	590	1,732	
Indiana, Illinois, Kentucky, etc	114,715	21.3	--------	241			23,863		116,782	21.4	--------	216			23,646	
Minnesota, Wisconsin, etc	10,639	23.9	--------	116			7,145		10,614	23.6	--------	150			6,756	
Oklahoma, Kansas, etc	65,120	24.5	--------	244			12,370		64,126	24.5	--------	145			12,219	
Texas Inland	17,801	16.3	290	112	1,298	1,508	1,707		17,802	15.9	252	98	1,654	387	1,685	
Texas Gulf Coast	168,100	25.1	895	73			12,893		180,878	27.2	140	56			14,293	
Louisiana Gulf Coast	53,182	21.6	39	32			5,568		59,139	23.0	18	31			6,755	
Arkansas, Louisiana Inland, etc	8,106	20.3	410	16			2,737		9,157	22.1	197	11			3,122	
New Mexico	1,521	17.9	--------	69	96	36	161		1,601	18.0	--------	54	142	34	192	
Rocky Mountain	23,878	22.9	--------	98			2,692		23,169	22.2	--------	90			2,511	
West Coast	68,545	15.8	--------	--------	--------	6,921	13,202		72,230	16.0	--------	--------	24	5,767	13,972	
Total	667,050	22.4	1,634	1,001	12,771	9,897	138,455	685,268	696,015	23.2	607	851	16,157	6,948	152,018	693,119

[1] Figures represent crude oil used as fuel on pipelines, which is considered part of the demand for distillate.
[2] Preliminary data.
[3] Not available.

The tanker freight rate for No. 2 distillate fuel oil from the gulf coast to New York Harbor averaged 43.3 cents per barrel in 1961 compared with 37.4 cents in 1960.

Pipelines delivered 238.4 million barrels of distillate in 1961 compared with 232.9 million in 1960. Coastwise shipments from the gulf coast and west coast to the east-coast State were 9.1 percent higher in 1961 and totaled 191.1 million barrels. Inland-waterway shipments up the Mississippi River from the gulf coast declined from 10.7 million barrels in 1960 to 9.0 million in 1961.

TABLE 60.—Shipments of distillate fuel oil[1] in the United States, by uses

(Thousand barrels)

Uses	1957	1958	1959	1960	1961	Percent change
Heating oils	360, 212	399, 153	401, 368	422, 855	440, 575	4. 2
Range oil (No. 1 fuel oil)	16, 832	13, 517	14, 153	15, 155	15, 487	2. 2
Industrial (excluding oil-company)	43, 532	37, 553	33, 380	34, 271	31, 062	−9. 4
Oil-company (excluding heating oil)	10, 419	7, 815	8, 642	8, 347	8, 743	4. 7
Gas and electric public-utility power-plants	5, 296	5, 382	5, 005	4, 742	4, 151	−12. 5
Railroads	88, 315	83, 719	87, 802	86, 490	85, 180	−1. 5
Bunkering of vessels (including company tankers but excluding military)	20, 420	18, 768	19, 250	18, 730	14, 566	−22. 2
Military (U.S. Army, Navy, Air Force, and Marine Corps)	12, 737	13, 412	11, 394	10, 793	11, 484	6. 4
Miscellaneous uses:						
Diesel fuel	49, 684	65, 186	70, 527	74, 562	72, 928	−2. 2
Other distillates	9, 828	9, 054	7, 471	7, 380	6, 698	−9. 3
Total United States	617, 275	653, 559	658, 992	683, 325	690, 874	1. 1

[1] Includes diesel fuel.

TABLE 61.—Shipments of distillate fuel oil[1] in the United States by PAD districts and States

(Thousand barrels)

District and State	1957	1958	1959	1960	1961
District 1:					
Connecticut	18,574	23,885	22,176	23,230	23,199
Delaware	3,245	2,413	2,487	2,723	2,537
District of Columbia	4,124	3,402	2,719	2,914	2,726
Florida	10,188	8,150	8,190	8,971	9,369
Georgia	4,877	4,887	4,731	5,117	5,269
Maine	6,426	6,434	7,108	7,456	8,307
Maryland	18,091	16,086	12,495	13,101	14,257
Massachusetts	35,981	47,452	47,781	51,022	52,266
New Hampshire	5,089	3,951	4,049	4,484	5,486
New Jersey	41,370	42,923	45,634	45,542	46,992
New York	72,755	85,779	79,499	81,677	86,029
North Carolina	9,312	10,406	11,544	13,353	13,366
Pennsylvania	45,698	45,322	44,029	45,668	45,982
Rhode Island	5,530	7,250	7,167	8,093	7,547
South Carolina	3,588	4,266	4,454	5,203	5,116
Vermont	1,883	2,796	2,399	2,939	3,299
Virginia	14,782	13,300	12,984	14,184	14,631
West Virginia	2,039	1,913	2,154	2,462	2,525
Total	303,552	330,615	321,600	338,139	348,903
District 2:					
Illinois	35,350	42,869	43,008	42,490	42,472
Indiana	20,482	24,099	24,500	25,596	25,842
Iowa	12,548	9,883	11,360	11,141	9,990
Kansas	6,361	4,477	5,060	4,751	5,045
Kentucky	4,548	4,978	5,800	4,833	4,403
Michigan	28,995	29,385	28,387	30,464	30,384
Minnesota	18,726	16,468	15,079	16,241	15,849
Missouri	12,418	14,274	12,700	12,830	12,820
Nebraska	5,549	3,527	3,929	4,183	4,395
North Dakota	3,726	2,976	3,632	3,775	3,734
Ohio	22,045	24,221	24,850	23,836	23,309
Oklahoma	2,470	1,754	2,603	2,631	3,136
South Dakota	3,508	2,800	2,882	2,964	3,053
Tennessee	3,652	3,226	5,037	5,268	5,522
Wisconsin	17,149	20,136	20,316	21,711	22,330
Total	197,527	205,073	209,143	212,714	212,284
District 3:					
Alabama	4,326	4,346	4,891	5,370	4,310
Arkansas	2,575	2,433	2,175	2,052	3,078
Louisiana	7,877	10,756	11,249	10,694	9,038
Mississippi	1,856	1,744	2,318	2,364	1,954
New Mexico	2,205	2,492	2,302	3,065	2,841
Texas	22,812	24,077	26,541	24,315	21,795
Total	41,651	45,848	49,476	47,860	43,016
District 4:					
Colorado	3,585	3,238	3,099	4,225	4,071
Idaho	3,834	3,938	3,734	4,055	4,168
Montana	4,209	3,642	4,474	4,877	4,768
Utah	4,256	4,655	3,478	3,841	3,969
Wyoming	2,977	3,697	3,539	3,258	3,085
Total	18,861	19,170	18,324	20,256	20,061
District 5:					
Alaska	(2)	(2)	2,618	2,616	2,849
Arizona	1,742	2,018	2,100	2,774	3,107
California	24,613	24,884	26,357	26,697	27,410
Hawaii	(3)	(3)	(3)	876	1,666
Nevada	1,679	1,656	2,051	2,428	2,985
Oregon	10,132	9,380	10,456	10,920	11,061
Washington	17,518	14,915	16,867	18,045	17,532
Total	55,684	52,853	60,449	64,356	66,610
Total United States	617,275	653,559	658,992	683,325	690,874

---

[1] Includes diesel fuel oil.
[2] Not included in United States totals before 1959.
[3] Not included in United States totals before 1960.

TABLE 62.—Monthly average prices of distillate fuel oil and diesel fuel in the United States

Year and grade	January	February	March	April	May	June	July	August	September	October	November	December	Average for year
1960:													
No. 2 fuel oil at refineries, Oklahoma......cents per gallon..	9.63	9.24	8.90	8.76	8.75	8.75	8.80	9.21	9.51	9.51	9.51	9.75	9.19
No. 2 fuel oil at New York Harbor..................do....	10.21	10.05	9.50	9.50	9.50	9.41	9.35	9.35	9.38	9.45	9.58	9.61	9.54
Diesel oil, shore plants, New York..................do....	10.57	10.35	9.85	9.85	9.85	9.69	9.55	9.55	9.63	9.85	9.57	9.98	9.86
Diesel oil for ships:													
New York........................dollars per barrel..	4.32	4.28	4.14	4.14	4.14	4.14	4.14	4.14	4.19	4.27	4.14	4.28	4.19
New Orleans..................................do....	4.01	3.97	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.95	3.90
San Pedro....................................do....	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09
1961:													
No. 2 fuel oil at refineries, Oklahoma......cents per gallon..	9.88	9.87	9.66	9.50	9.22	9.13	9.13	9.13	9.13	9.13	9.25	9.51	9.38
No. 2 fuel oil at New York Harbor..................do....	10.44	10.89	10.96	10.50	10.02	10.00	10.04	10.30	10.30	10.30	10.30	10.66	10.39
Diesel oil, shore plants, New York..................do....	10.78	11.24	11.32	10.85	10.61	10.60	10.63	10.90	10.90	10.90	10.90	11.07	10.89
Diesel oil for ships:													
New York........................dollars per barrel..	4.58	4.76	4.79	4.60	4.39	4.39	4.42	4.52	4.52	4.52	4.52	4.67	4.56
New Orleans..................................do....	4.18	4.43	4.48	4.40	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.22	4.20
San Pedro....................................do....	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09

Source: Platts' Oil Price Handbook.

RESIDUAL FUEL OIL

The total demand for residual fuel oil in 1961 (554.6 million barrels) was 23.3 million less than the preceding year. Exports for 1961 declined 4.4 million barrels and domestic demand, 18.9 million barrels.

Less residual fuel oil was available from domestic sources in 1961. The refinery yield of residual fuel oil per barrel of crude oil processed decreased from 11.2 percent in 1960 to 10.5 percent. This reduction in yield resulted in a 16.6-million-barrel decline in the refinery output. Crude oil used as fuel (transfers) totaled 3.9 million barrels, slightly below 1960 transfers.

Imports supplied 42.4 percent of residual fuel oil requirements in 1961 compared with 40.4 percent in 1960. Total imports of residual averaged 644,000 barrels daily in 1961. The Oil Import Administration controls the imports of residual fuel oil for immediate consumption. Exempted from the quota regulations are residual imported for bunkering vessels engaged in foreign trade, used offshore by the the military. or used for manufacture and re-export. Shipments from Puerto Rico and overland receipts from Canada and Mexico are also exempt. According to Oil Imports Administration data, 446,000 barrels daily of residual were imported under the quota in 1961 compared with 422,000 barrels in 1960.

Interdistrict shipments by tidewater and river were 5.5 million barrels lower in 1961. Shipment from PAD District 3 to PAD District 1 declined 3.4 million barrels and to PAD District 2, 1 million barrels. Shipments to the Atlantic coast States from the west coast were down 1.1 million barrels.

The average tanker rate for Bunker "C" fuel oil from the gulf-coast district to destinations north of Cape Hatteras increased from 30.5 cents per barrel in 1960 to 45.7 cents per barrel in 1961.

The 1961 average annual posted price of No. 6 residual fuel oil at Oklahoma refineries was $1.88 per barrel, 1 cent less than in 1960.

TABLE 63.—Salient statistics of residual fuel oil in the United States, by months and districts

(Thousand barrels unless otherwise stated)

Month and district	Production	Yield (percent)	Transfers[1]		Imports	Exports	Stocks (end of month)	Domestic demand	Production	Yield (percent)	Transfers[1]		Imports	Exports	Stocks (end of month)	Domestic demand
			East of California	California							East of California	California				
	1960								1961[2]							
Month:																
January	32, 452	12. 6	245	51	26, 092	1, 728	49, 306	61, 307	29, 894	11. 4	327	39	27, 866	1, 176	42, 934	58, 886
February	28, 938	12. 4	316	55	24, 562	1, 685	45, 775	55, 717	27, 758	11. 6	297	47	25, 691	1, 014	42, 635	53, 078
March	31, 065	12. 5	300	41	25, 603	1, 767	40, 503	60, 514	27, 383	11. 0	247	107	22, 757	1, 322	40, 889	50, 918
April	26, 410	11. 1	312	21	19, 551	1, 750	39, 285	45, 762	24, 990	10. 8	339	24	22, 944	1, 253	41, 848	46, 085
May	26, 072	10. 7	354	57	15, 590	1, 484	39, 628	40, 246	26, 551	10. 7	261	16	16, 647	1, 630	44, 137	39, 556
June	25, 297	10. 3	319	31	17, 073	1, 967	41, 074	39, 307	23, 318	9. 8	233	76	12, 330	1, 125	47, 362	31, 607
July	26, 265	10. 2	224	39	13, 944	875	43, 848	36, 823	25, 824	9. 9	252	20	16, 871	805	50, 242	39, 282
August	26, 125	10. 0	235	131	14, 942	1, 888	47, 177	36, 216	25, 212	9. 5	235	79	12, 819	1, 398	48, 771	38, 418
September	25, 779	10. 4	316	41	15, 489	1, 357	50, 136	37, 309	23, 851	9. 8	246	92	14, 754	880	50. 341	36, 493
October	25, 755	10. 6	224	44	15, 990	1, 175	50, 003	40, 971	25, 106	9. 8	262	81	17, 376	1, 194	48, 969	43, 003
November	27, 116	11. 3	283	51	21, 623	1, 304	49, 525	48, 247	25, 713	10. 3	233	23	20, 999	954	46, 694	48, 289
December	30, 873	12. 1	244	14	22, 749	1, 515	44, 870	57, 020	29, 977	11. 3	248	70	24, 129	1, 286	44, 869	54, 963
Total	332, 147	11. 2	3, 372	576	233, 208	18, 495	44, 870	559, 439	315, 577	10. 5	3, 180	674	235, 183	14, 037	44, 869	540, 578
District:																
East Coast	55, 686	12. 6	228	--------	211, 788	122	12, 140	(3)	53, 873	12. 2	183	--------	206, 370	75	12, 131	(3)
Appalachian No. 1	3, 844	10. 8	--------	--------			529		3, 701	10. 1	--------	--------			436	
Appalachian No. 2	4, 485	12. 1	--------	--------	59	878	367		3, 954	10. 9	--------	--------	284	507	380	
Indiana, Illinois, Kentucky, etc	60, 369	11. 2	511	--------			6, 053		55, 885	10. 3	287	--------			6, 000	
Minnesota, Wisconsin, etc	6, 532	14. 6	40	--------			582		6, 426	14. 3	36	--------			656	
Oklahoma, Kansas, etc	8, 486	3. 2	360	--------			995		6, 722	2. 6	360	--------			810	
Texas Inland	7, 417	6. 8	429	--------	14, 416	3, 629	2, 551		7, 074	6. 3	389	--------	12, 318	1, 858	2, 565	
Texas Gulf Coast	51, 212	7. 6	566	--------			5, 184		46, 176	6. 9	561	--------			5, 102	
Louisiana Gulf Coast	16, 784	6. 8	688	--------			1, 301		16, 537	6. 4	682	--------			1, 212	
Arkansas, Louisiana Inland, etc	2, 403	6. 0	218	--------			155		2, 210	5. 3	207	--------			229	
New Mexico	881	10. 4	80	--------			27		820	9. 2	79	--------			61	
Rocky Mountain	11, 505	11. 0	252	--------	--------	2	1, 002		12, 282	11. 8	396	--------	1	4	1, 023	
West Coast	102, 543	23. 7	--------	576	6, 945	13, 864	13, 984		99, 917	22. 2	--------	674	16, 210	11, 593	14, 264	
Total	332, 147	11. 2	3, 372	576	233, 208	18, 495	44, 870	559, 439	315, 577	10. 5	3, 180	674	235, 183	14, 037	44, 869	540, 578

[1] Represents crude oil used as fuel on leases and for general industrial purposes.
[2] Preliminary data.
[3] Not available.

TABLE 64.—Shipments of residual fuel oil [1] in the United States, by uses

(Thousand barrels)

	1957	1958	1959	1960	1961	Percent change
Heating oils	81,412	105,639	111,850	125,088	121,097	−3.2
Industrial (excluding oil company fuel)	166,885	143,142	167,701	157,270	153,766	−2.2
Oil-company use (excluding heating oil)	50,153	46,463	46,177	45,061	44,399	−1.5
Gas and electric public utility powerplants	76,577	76,995	82,208	85,408	87,881	2.9
Railroads	6,953	5,772	5,613	5,610	5,347	−4.7
Bunkering of vessels (including company tankers but excluding military)	123,651	106,269	102,049	94,084	87,308	−7.2
Military use (U.S. Army, Navy, Air Force, and Marine Corps)	28,962	37,428	31,415	31,724	36,762	15.9
Miscellaneous uses	9,984	9,659	7,339	6,291	6,426	2.1
Total United States	544,577	531,367	554,352	550,536	542,986	−1.4

[1] Includes Navy grade and crude oil burned as fuel.

TABLE 65.—Shipments of residual fuel oil [1] in the United States by PAD districts and States

(Thousand barrels)

District and State	1957	1958	1959	1960	1961
District 1:					
Connecticut	12,712	17,041	15,814	14,450	14,549
Delaware	2,973	5,992	7,063	6,081	4,986
District of Columbia	2,501	2,243	2,450	2,387	1,955
Florida	36,228	37,470	33,310	28,978	32,600
Georgia	6,128	7,145	6,824	6,413	5,048
Maine	5,063	5,290	6,433	5,742	6,366
Maryland	15,364	14,974	17,385	16,490	12,955
Massachusetts	28,744	29,308	35,532	38,942	40,242
New Hampshire	2,096	2,022	2,984	2,324	2,067
New Jersey	45,136	36,841	41,422	42,791	42,990
New York	51,168	71,533	79,784	76,586	83,518
North Carolina	2,467	3,034	3,908	4,537	4,738
Pennsylvania	44,482	39,873	45,660	42,731	38,970
Rhode Island	11,114	11,127	10,350	9,502	7,543
South Carolina	4,383	4,660	4,886	4,634	5,031
Vermont	380	455	275	498	540
Virginia	17,739	21,411	17,703	17,448	14,195
West Virginia	1,321	894	1,620	1,451	1,216
Total	289,999	311,313	333,403	321,985	319,509
District 2:					
Illinois	21,375	26,926	23,689	25,893	25,750
Indiana	14,753	11,955	13,035	12,885	11,988
Iowa	1,125	869	1,088	1,021	1,032
Kansas	3,586	1,420	1,943	2,249	1,433
Kentucky	1,051	503	570	321	278
Michigan	15,330	9,340	13,498	11,242	9,896
Minnesota	2,955	4,963	6,399	6,363	5,524
Missouri	5,758	3,774	3,129	3,026	2,638
Nebraska	375	151	218	378	419
North Dakota	783	625	597	663	552
Ohio	18,530	9,721	11,028	11,382	9,023
Oklahoma	1,740	1,001	1,319	1,396	873
South Dakota	217	100	48	60	36
Tennessee	865	384	284	184	171
Wisconsin	2,201	3,458	4,167	4,275	4,028
Total	90,644	75,190	81,012	81,338	73,641
District 3:					
Alabama	4,203	4,240	4,178	4,202	3,555
Arkansas	549	455	346	474	379
Louisiana	11,359	13,411	10,764	8,599	8,537
Mississippi	232	268	435	339	338
New Mexico	438	359	107	173	311
Texas	37,859	29,082	25,275	22,102	21,437
Total	54,640	47,815	41,105	35,889	34,557
District 4:					
Colorado	1,369	1,330	1,603	1,790	2,465
Idaho	1,185	210	185	201	422
Montana	1,554	1,643	2,006	2,022	2,533
Utah	4,828	5,077	5,872	5,562	5,654
Wyoming	1,847	2,325	1,842	1,738	2,555
Total	10,783	10,585	11,508	11,313	13,629
District 5:					
Alaska	(2)	(2)	574	695	641
Arizona	21	37	34	95	94
California	79,245	72,232	72,287	78,774	81,587
Hawaii	(3)	(3)	(3)	5,613	6,646
Nevada	269	195	146	202	258
Oregon	7,181	5,253	5,121	5,453	4,879
Washington	11,795	8,747	9,162	9,179	7,545
Total	98,511	86,464	87,324	100,011	101,650
Total United States	544,577	531,367	554,352	550,536	542,986

---

[1] Includes some crude oil burned as fuel.

[2] Not included in United States totals before 1959.

[3] Not included in United States totals before 1960.

TABLE 66.—Monthly average prices of residual fuel oil in the United States, in dollars per barrel

Year and grade	January	February	March	April	May	June	July	August	September	October	November	December	Average for year
1960:													
No. 6 fuel oil at refineries, Oklahoma	1.93	1.91	1.83	1.75	1.75	1.87	1.95	1.95	1.95	1.95	1.95	1.95	1.89
No. 5 fuel oil at New York Harbor	3.00	2.97	2.91	2.91	2.91	2.91	2.98	3.02	3.02	3.02	3.02	3.02	2.97
Bunker "C" for ships:													
New York	2.37	2.37	2.37	2.42	2.40	2.37	2.46	2.52	2.52	2.52	2.52	2.52	2.45
New Orleans	2.10	2.10	2.10	2.10	2.10	2.10	2.23	2.30	2.30	2.30	2.30	2.30	2.19
San Pedro	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.11	2.20	2.20	2.20	2.13
1961:													
No. 6 fuel oil at refineries, Oklahoma	1.95	1.95	1.95	1.89	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.88
No. 5 fuel oil at New York Harbor	3.07	3.13	3.13	3.08	3.02	3.02	3.03	3.06	3.06	3.06	3.06	3.11	3.07
Bunker "C" for ships:													
New York	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52
New Orleans	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30
San Pedro	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20

Source: Platt's Oil Price Handbook.

LUBRICANTS

Domestic demand for lubricants in 1961 continued to decline but including a 7.5-percent increase in exports, total demand was 0.2 percent higher.

Production of lubricating oils was 59.3 million barrels, slightly less than the preceding year. Stocks increased 640 thousand barrels during the year.

Posted refinery prices for all grades of lubricating oils in Texas and the midcontinent were unchanged throughout the year. Prices quoted for bright stocks and cylinder stocks in Western Pennsylvania were increased by 1 cent in January and again by 1 cent in July.

TABLE 67.—Salient statistics of lubricants in the United States, by months and districts

(Thousand barrels unless otherwise stated)

Month and district	1960						1961 [1]					
	Production	Yield (percent)	Imports	Exports	Stocks, end of period	Domestic demand	Production	Yield (percent)	Imports	Exports	Stocks, end of period	Domestic demand
By months:												
January	4,895	1.9	---------	1,193	9,365	3,287	4,716	1.8	1	1,045	12,376	3,599
February	4,614	2.0	1	1,042	9,588	3,350	4,723	2.0	1	1,508	12,791	2,801
March	5,027	2.0	1	1,328	9,637	3,651	5,025	2.0	2	1,587	12,695	3,536
April	5,052	2.1	2	1,426	9,665	3,600	5,065	2.2	---------	1,374	13,388	2,998
May	4,953	2.0	2	1,315	9,404	3,901	5,276	2.2	2	1,545	13,072	4,049
June	4,921	2.0	1	1,558	9,068	3,700	4,562	1.9	1	1,326	12,735	3,574
July	5,232	2.0	1	1,477	9,032	3,792	5,153	1.9	2	1,527	12,882	3,481
August	4,689	1.8	1	1,000	8,942	3,690	5,144	1.9	---------	1,721	12,560	3,745
September	4,944	2.0	4	1,257	9,149	3,484	4,547	1.9	1	1,212	12,400	3,496
October	4,907	2.0	3	1,385	9,194	3,480	5,075	2.0	2	1,404	12,279	3,794
November	5,094	2.1	2	1,357	9,463	3,470	5,020	2.1	1	1,504	12,326	3,470
December	5,061	2.0	4	1,383	12,303	3,271	4,948	1.8	1	1,236	12,942	3,096
Total	59,389	2.0	22	15,811	[2] 12,303	42,676	59,254	2.0	14	16,989	12,943	41,639
By districts:												
East Coast	8,642	2.0	18	(3)	3,393	(3)	7,922	1.8	11	4,442	3,153	(3)
Appalachian No. 1	3,366	9.5			655		3,077	8.4			622	
Appalachian No. 2	486	1.3	---------		114		368	1.0	---------	391	81	
Indiana, Illinois, Kentucky, etc	4,861	.9			1,525		4,896	.9			1,889	
Minnesota, Wisconsin, North and South Dakota	---------	---------			27		---------	---------			29	
Oklahoma, Kansas, etc	4,754	1.8			598		4,766	1.8			646	
Texas Inland	182	.2	2		41		174	.2	3	10,067	40	
Texas Gulf Coast	22,485	3.4			3,424		22,530	3.3			3,611	
Louisiana Gulf Coast	6,409	2.6			866		7,039	2.7			1,016	
Arkansas, Louisiana Inland, etc	2,062	5.2			263		1,939	4.6			489	
New Mexico	---------	---------			6		---------	---------			3	
Rocky Mountain	324	.3	---------		89		339	.3		---------	97	
West Coast	5,818	1.3	2		1,302		6,204	1.4	---------	2,089	1,267	
Total	59,389	2.0	22	15,811	[2] 12,303	42,676	59,254	2.0	14	16,989	12,943	41,639

[1] Preliminary figures. [2] New basis: December 31, 1960, stocks on an old basis was 9,874,000 barrels. [3] Figures not available.

TABLE 68.—Average monthly refinery prices of five selected grades of lubricating oil in the United States, in cents per gallon

Year and grade	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov	Dec.	Average for year
1960:													
Oklahoma:													
200 viscosity, No. 3 color, neutral	19.00	19.00	19.00	19.00	20.11	20.50	20.50	20.50	20.50	20.50	20.50	20.50	19.97
150-160 viscosity at 210° bright stock, 10-25 pour test	22.50	22.50	22.50	22.50	23.24	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.15
Pennsylvania:													
200 viscosity, No. 3 color, neutral 420-425 flash, 25 pour test	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.63	28.00	28.00	28.00	27.30
600 steam-refined, cylinder stock, filterable	17.00	17.91	18.00	18.00	18.00	18.00	18.00	18.66	19.00	19.00	19.00	19.00	18.30
South Texas: 500 viscosity, No. 2½-3½ color, neutral	19.00	19.00	19.00	19.00	19.00	19.47	20.00	20.00	20.00	20.00	20.00	20.00	19.54
1961:													
Oklahoma:													
200 viscosity, No. 3 color, neutral	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50
150-160 viscosity at 210° bright stock, 10-25 pour test	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50
Pennsylvania:													
200 viscosity, No. 3 color, neutral 420-425 flash, 25 pour test	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00
600 steam-refined, cylinder stock, filterable	19.34	20.00	20.00	20.00	20.00	20.00	20.55	21.00	21.00	21.00	21.00	21.00	20.41
South Texas: 500 viscosity, No. 2½-3½ color, neutral	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00

Source: Platt's Oil Price Handbook.

JET FUEL (MILITARY GRADE)

The 95.2 million barrels of military-grade jet fuel produced at refineries in 1961 was blended from 74 percent gasoline, 14 percent kerosine, and 12 percent distillate fuel oil.

The total demand for jet fuel was 1.8 percent higher in 1961. Domestic demand totaled 104.6 million barrels and exports, 0.1 million.

The jet fuel reported in this category represents that used by the military or by aircraft and missile manufacturers testing equipment for the U.S. Government.

TABLE 69.—Salient statistics of jet fuel in the United States, by months and districts

(Thousand barrels)

Month and district	Production, blended from—				Transfers from gasoline plants	Imports	Exports	stocks, end of period	Domestic demand	Production, blended from—				Transfers from gasoline plants	Imports	Exports	Stocks end of period	Domestic demand
	Gasoline	Kerosine	Distillate	Total						Gasoline	Kerosine	Distillate	Total					
	1960									1961[1]								
By months:																		
January	5,602	998	650	7,250	127	608	57	6,846	8,973	4,842	897	970	6,709	69	331	2	5,991	7,986
February	5,629	1,091	594	7,314	50	1,415	------	7,041	8,584	4,924	900	850	6,674	39	832	6	6,417	7,113
March	5,427	1,199	646	7,272	114	837	1	6,386	8,877	6,485	1,332	1,061	8,878	71	542	16	7,131	8,761
April	5,663	1,210	564	7,437	40	580	------	6,556	7,887	5,923	1,124	926	7,973	56	785	24	7,783	8,138
May	5,466	1,268	604	7,338	116	1,552	------	6,810	8,752	6,050	1,147	1,104	8,301	73	2,095	------	7,621	10,631
June	5,681	1,420	793	7,894	16	1,289	1	6,753	9,255	5,570	1,081	888	7,539	5	1,262	15	7,876	8,536
July	5,550	1,174	804	7,528	101	1,262	20	6,892	8,732	5,671	1,262	1,139	8,072	116	150	1	8,245	7,968
August	5,601	1,167	1,028	7,796	33	880	4	7,343	8,254	6,714	1,194	954	8,862	68	1,045	30	8,455	9,735
September	5,099	1,034	828	6,961	78	542	10	6,431	8,483	5,932	1,133	902	7,967	15	1,733	1	7,923	10,246
October	5,000	1,093	805	6,898	67	907	------	6,034	8,269	5,743	1,034	755	7,532	72	636	26	7,690	8,447
November	5,228	1,243	820	7,291	70	1,117	20	6,020	8,472	6,145	1,052	957	8,154	60	294	1	7,797	8,400
December	5,309	1,107	853	7,269	49	1,383	------	[2] 6,870	8,265	6,437	1,044	1,068	8,549	69	503	------	8,280	8,638
Total	65,255	14,004	8,989	88,248	861	12,372	113	[2] 6,870	102,803	70,436	13,200	11,574	95,210	713	10,208	122	8,280	104,599
By districts:																		
East Coast	2,001	1,011	52	3,064	--------	11,395	(3)	632	(3)	2,406	674	3	3,083	--------	8,624	1	508	(3)
Appalachian No. 1	94	--------	------	94	--------			49		222	4	--------	226	--------			30	
Appalachian No. 2	--------	400	------	400	--------	-------		59		--------	332	--------	332	--------	-------	-------	76	
Indiana, Illinois, Kentucky, etc	4,278	905	2,179	7,362	--------			686		6,896	897	3,664	11,457	--------			1,229	
Minnesota, Wisconsin, North and South Dakota	705	74	------	779	--------			135		1,100	143	--------	1,243	--------			209	
Oklahoma, Kansas, Missouri, etc	11,533	2,131	2,708	16,372	--------			1,072		9,911	1,961	2,964	14,836	--------			1,104	
Texas Inland	10,445	938	1,329	12,712	--------	-------		656		11,159	777	1,253	13,189	--------	-------	1	762	
Texas Gulf Coast	10,500	4,156	92	14,748	--------			1,102		10,792	3,434	222	14,448				1,171	
Louisiana Gulf Coast	7,940	287	88	8,315	--------			309		9,002	313	290	9,605	--------			870	
Arkansas, Louisiana Inland, etc	737	--------	148	885	861			176		590	--------	332	922	713			322	
New Mexico	1,338	30	------	1,368	--------			101		1,057	309	53	1,419	--------			65	
Rocky Mountain	3,904	856	562	5,322	--------	--------		502		4,312	569	936	5,817	--------	--------	------	563	
West Coast	11,780	3,216	1,831	16,827	--------	977		1,391		12,989	3,787	1,857	18,633	--------	1,584	120	1,371	
	65,255	14,004	8,989	88,248	861	12,372	113	[2] 6,870	102,803	70,436	13,200	11,574	95,210	713	10,208	122	8,280	104,599

---

[1] Preliminary figures.
[2] New basis: December 31, 1960, stocks on an old basis was 6,456, 000 barrels.
[3] Figures not available.

LIQUEFIED GASES (INCLUDING ETHANE)

Liquefied gases are derived from two sources. Those produced at refineries are called liquefied refinery gases to distinguish them from those extracted from natural gas, which are called liquefied petroleum gases. The liquefied petroleum gases are all saturated (that is, propane, butane, etc.). The liquefied refinery gases may contain unsaturated compounds or olefins (that is, propylene, butylene, etc.). The olefins are used as feed stock for chemical plants. The saturated gases may be used as chemical raw materials or as fuel. Liquefied gases are also used in producing gasoline and are reported in this chapter as natural-gas liquids used at refineries or as gasoline. Although ethane and ethylene are not defined as liquefied gases, the statistics of these products are in some cases reported with those of LPG.

Liquefied gas production was 4.9 percent higher in 1961. Natural-gasoline plants produced 359.1 million barrels, and the refinery output was 78.9 million barrels. The total demand for liquefied gases in 1961 was 429.0 million barrels, of which 188.6 million was blended into gasoline, 4.8 million was transferred to other products, and 235.6 million was for fuel and chemical uses.

More detailed information on liquefied gases may be found in the Natural-Gas Liquids Chapter.

TABLE 70.—Salient statistics of liquefied petroleum gas and ethane in the United States, by months and districts

(Thousand barrels unless otherwise stated)

Month and district	1960							1961[1]						
	Production	Yield (percent)	Transfers from gasoline plants	Imports	Exports	Stocks, end of period	Domestic demand	Production	Yield (percent)	Transfers from gasoline plants	Imports	Exports	Stocks, end of period	Domestic demand
By months:														
January	6,260	2.4	16,573	164	232	2,213	23,072	6,947	2.6	18,977	166	282	3,718	25,713
February	6,277	2.7	15,271	166	206	2,189	21,532	6,413	2.7	14,481	116	298	3,791	20.639
March	6,990	2.8	16,565	119	214	2,097	23.552	6,864	2.7	11,186	159	296	4,186	17,518
April	6,591	2.8	9,798	151	246	2,325	16,066	6,617	2.9	11,240	159	219	4,475	17,508
May	6,307	2.6	8,734	161	219	2,544	14,764	7,140	2.9	10,181	212	313	5,714	15,981
June	6,604	2.7	8,557	133	222	2,781	14,835	6,604	2.8	10,067	152	263	5,919	16.355
July	6,747	2.6	8,859	61	262	3,129	15,057	6,171	2.3	9,908	112	261	6,165	15,684
August	6,716	2.6	11,762	69	251	3,318	18,107	6,439	2.5	11,757	92	338	6,165	17,950
September	6,229	2.5	9,507	96	240	3,473	15,437	5,889	2.4	11,338	102	308	6,293	16,893
October	5,997	2.4	12,285	123	244	3,486	18,148	6,254	2.4	13,625	213	333	6,523	19,529
November	6,128	2.5	15,112	225	295	3,651	21,005	6,557	2.7	15,557	152	327	6,715	21,747
December	6,732	2.6	19,150	163	357	3,623	25,716	7,052	2.7	19,162	171	303	6,298	26,499
Total	77,578	2.6	152,173	1,631	2,988	3,623	227,291	78,947	2.6	157,479	1,806	3,541	6,298	232,016
By districts:														
East Coast	9,793	2.2	(2)	321	29	433	(2)	10,345	2.3	(2)	399	91	701	(2)
Appalachian No. 1	572	1.6				11		596	1.6				15	
Appalachian No. 2	153	.4		934	114	2		165	.5		870	56	2	
Indiana, Illinois, Kentucky, etc	8,189	1.5				553		8,958	1.6				706	
Minnesota, Wisconsin, North & South Dakota	746	1.7				21		604	1.3				18	
Oklahoma, Kansas, etc	6,251	2.4				154		6,831	2.6				302	
Texas Inland	3,324	3.1		-----	2,102	106		3,567	3.2		3	2,599	168	
Texas Gulf Coast	20,404	3.0				295		20,765	3.1				1,014	
Louisiana Gulf Coast	16,264	-----				1,131		14,532	5.6				1,675	
Arkansas, Louisiana Inland, etc	908	2.3				15		916	2.2				273	
New Mexico	57	.7				4		147	1.7				6	
Rocky Mountain	1,499	1.4		25	-----	22		1,457	1.4		35	-----	21	
West Coast	9,418	2.2		351	743	876		10,064	2.2		499	795	1,397	
Total	77,578	2.6	152,173	1,631	2,988	3,623	227,291	78,947	2.6	157,479	1,806	3,541	6,298	232,016

[1] Preliminary figures.
[2] Figures not available.

ASPHALT AND ROAD OIL

The total demand for asphalt increased 2.7 percent in 1961; domestic demand increased 3.0 percent for the year; exports declined 31.5 percent.

Shipments of asphalt and asphaltic products were 3.3 percent higher than the preceding year. Asphalt for paving purposes which represents 74 percent of the total shipments were 4 percent higher. Roofing products, which is the second largest use category representing 18 percent of the total asphalt shipments, were 3 percent higher for the year.

The demand for road oil, based on refinery production and stock change, was 5.8 million barrels in 1961, 1.3 percent less than in 1960. Shipments of road oil, which includes some products which were reclassified after leaving the refinery, totaled 6.0 million barrels in 1961 compared with 6.5 million in 1960.

TABLE 71.—Statistical summary of petroleum asphalt and road oil

(Thousand short tons) [1]

	1957	1958	1959	1960	1961 [2]
Petroleum asphalt:					
Production	15,579	16,251	17,753	17,940	18,513
Imports (including natural)	1,162	1,360	1,250	1,117	1,204
Exports	325	248	188	168	115
Stocks (end of period)	1,902	1,774	1,991	[3] 2,362	2,363
Domestic demand	16,178	17,491	18,598	19,036	19,601
Petroleum asphalt shipments:					
Paving	11,934	13,384	14,581	14,674	15,318
Roofing	2,819	3,101	3,299	3,525	3,635
All other	1,620	1,694	1,895	1,855	1,755
Total	16,373	18,179	19,775	20,054	20,708
Road oil:					
Production	1,311	1,077	1,181	1,085	1,058
Stocks (end of period)	107	76	119	135	138
Domestic demand	1,295	1,108	1,138	1,069	1,055
Road oil shipments	1,306	1,165	1,143	1,177	1,083

[1] Converted from barrels to short tons (5.5 barrels = 1 short ton).

[2] Preliminary figures.

[3] New basis, to include bulk terminal stocks of 518 short tons. December 31, 1960, stocks on old basis for comparison with previous years were 1,844 short tons.

TABLE 72.—Salient statistics of petroleum asphalt in the United States by months and districts

(Thousand short tons)[1]

Month and district	Production	Imports[2] (including natural)	Exports[3]	Stocks (end of period)	Domestic demand	Production	Imports[2] (including natural)	Exports[3]	Stocks (end of period)	Domestic demand
	1960					1961[4]				
Month:										
January	826	81	6	2,334	557	905	60	5	2,764	559
February	793	36	11	2,567	585	824	47	8	3,209	417
March	867	40	16	2,776	682	1,077	55	8	3,489	844
April	1,403	111	14	3,060	1,216	1,398	80	12	3,934	1,022
May	1,718	53	16	3,098	1,718	1,708	119	10	3,867	1,884
June	2,008	214	10	2,866	2,444	1,978	185	12	3,504	2,514
July	2,141	116	12	2,593	2,518	2,145	144	10	3,218	2,565
August	2,203	102	22	2,052	2,825	2,164	134	7	2,568	2,940
September	2,027	98	20	1,656	2,500	1,975	123	7	2,208	2,451
October	1,771	92	13	1,480	2,026	1,913	100	10	1,907	2,303
November	1,239	99	15	1,562	1,241	1,373	98	12	1,979	1,388
December	944	75	13	[5] 2,362	724	1,053	59	14	2,363	714
Total	17,940	1,117	168	[5] 2,362	19,036	18,513	1,204	115	2,363	19,601
District:										
East Coast	3,918	(6)	(6)	715	(6)	4,001	(6)	18	626	(6)
Appalachian No. 1	227			22		264			53	
Appalachian No. 2	442			47		436		3	46	
Indiana, Illinois, Kentucky, etc	3,423			350		3,446			373	
Minnesota, Wisconsin, North Dakota	244			29		258			37	
Oklahoma, Kansas, etc	1,890			271		2,055			355	
Texas Inland	865			85		889		77	91	
Texas Gulf Coast	1,415			92		1,296			43	
Louisiana Gulf Coast	808			146		974			125	
Arkansas, Louisiana Inland, etc	773			131		870			107	
New Mexico	89			14		82			14	
Rocky Mountain	1,275			166		1,300		-----	227	
West Coast	2,571			294		2,642		17	266	
Total	17,940	1,117	168	[5] 2,362	19,036	18,513	1,204	115	2,363	19,601

---

[1] Converted from barrels to short tons (5.5 barrels=1 short ton).
[2] Imports into the United States only.
[3] Excludes shipments to noncontiguous territories.
[4] Preliminary.
[5] New basis: Dec. 31, 1960, stocks on old basis was 1,844,000 short tons.
[6] Not available.

TABLE 73.—Salient statistics of road oil in the United States by months and districts

(Short tons)[1]

Month and district	Production	Stocks (end of period)	Domestic demand	Production	Stocks (end of period)	Domestic demand
	1960			1961[2]		
Month:						
January	13,455	120,182	12,000	30,545	125,636	40,000
February	38,545	142,727	16,000	34,182	147.091	12,727
March	27,636	159,636	10,727	65,091	197,091	15,091
April	93,818	212,000	41,454	71.273	241,273	27,091
May	125,455	259,091	78,364	130,364	286,000	85.637
June	153,091	260,909	151,273	166,182	274,182	178.000
July	216,364	243,273	234,000	180,182	239,091	215,273
August	171,454	173,818	240,909	177,273	185,091	231,273
September	93,636	127,454	140,000	95,455	162,182	118,364
October	58,909	116,545	69,818	44,909	132,727	74.364
November	44,545	132,727	28,363	31,273	136,000	28,000
December	48,546	135,091	46,183	31,455	138,364	29,091
Total	1,085,454	135,091	1,069,091	1,058,184	138,364	1,054,911
District:						
East Coast	4,364	----------	(3)	5,455	----------	(3)
Appalichian No. 1	----------	----------		----------	----------	
Appalachian No. 2	----------	----------		910	----------	
Indiana, Illinois, Kentucky, etc.	324,727	16,000		318,000	22,182	
Minnesota, Wisconsin, North Dakota	42,363	----------		35,636	----------	
Oklahoma, Kansas, etc.	192,364	11,455		195,091	20,182	
Texas Inland	----------	----------		----------	----------	
Texas Gulf Coast	2,182	182		910	364	
Louisiana Gulf Coast	5,273	182		546	545	
Arkansas, Louisiana Inland, etc.	2,364	181		1,818	182	
New Mexico	----------	----------		----------	----------	
Rocky Mountain	266,727	30,909		288,727	28,545	
West Coast	245,090	76,182		211,091	66,364	
Total	1,085,454	135,091	1,069,091	1,058,184	138,364	1,054,911

---

[1] Converted from barrels to short tons (5.5 barrels = 1 short ton).
[2] Preliminary figures.
[3] Not available.

TABLE 74.—Shipments of petroleum-asphalt-paving products in the United States, by PAD districts and States

(Short tons)

District and State	Asphalt cements		Cutback asphalts		Emulsified asphalts		Total	
	1960	1961	1960	1961	1960	1961	1960	1961
District 1:								
Connecticut	120,219	112,040	57,249	43,112	13	1,893	177,481	157,045
Delaware	19,724	7,742	16.269	15,736	5,879	5,420	41.872	28.898
Florida	253,066	244,307	113,678	122,596	24,226	25,510	390.970	392,413
Georgia	208,416	248.260	59,144	75,348	33,802	34,066	301.362	357,674
Maine	49,076	46,170	72,994	107,641	14,774	14,026	136.844	167,837
Maryland and D.C.	166,920	231,327	68,742	98,410	37,138	43,354	272,800	373.091
Massachusetts	257,346	254,617	51,657	51,799	900	3,404	309,903	309,820
New Hampshire	40,994	28,027	48,582	39,879	67	9	89,643	67,915
New Jersey	244,189	301,602	95,077	110,047	19,786	26,735	359,052	438,384
New York	569,788	549,365	254,288	248,869	130,426	121.195	954,502	919,429
North Carolina	193,205	154,977	88,102	144,256	101,826	87,772	383,133	387,005
Pennsylvania	384,259	382,283	158,735	165,250	55,205	58,000	598,199	605,533
Rhode Island	45,109	51,784	49,218	65,592	---	---	94,327	117,376
South Carolina	139,777	139,111	36.592	34,509	80,207	76,411	256,576	250.031
Vermont	17,000	28,373	22,846	14,081	326	183	40,172	42,637
Virginia	186,598	231,943	97,095	127,842	27,771	34,413	311,464	394,198
West Virginia	70,227	83,210	32,523	20,201	13,357	8,683	116,107	112,094
Total	2,965,913	3,095,138	1,322,791	1,485,168	545,703	541,074	4,834,407	5,121,380
District 2:								
Illinois	229,991	264,359	174,196	157,592	8,336	22.434	412,523	444,385
Indiana	178,186	166,145	144,005	130,711	117,918	143,570	440,109	440,426
Iowa	279,087	289,480	117.012	113,091	44,935	38,457	441,034	441,028
Kansas	141,531	191.723	235,291	265,655	1,165	1,611	377,987	458,989
Kentucky	133,134	153,931	85,765	81,864	55,141	48,440	274,040	284,235
Michigan	298,742	199,605	88,346	82,890	60,136	70,785	447,224	353,280
Minnesota	176,431	214,705	211,203	247,893	18,991	24,820	406,625	487,418
Missouri	157,828	152.985	216.318	259,541	11,779	4,211	385,925	416,737
Nebraska	63,778	56,791	73,660	66,910	125	1,973	137,563	125,674
North Dakota	74,885	61,605	55,864	51,030	68,634	47,325	199,383	159,960
Ohio	494,760	410,592	338,208	283,383	163,089	160,710	996,057	854,685
Oklahoma	152,378	210.820	182,188	137,989	7,576	3,649	342,142	352,458
South Dakota	54,088	61,279	49,592	48,999	4,814	6,076	108,494	116,354
Tennessee	168,282	213,964	82,474	66,795	18,299	22,025	269,055	302,784
Wisconsin	202,410	163,179	115,050	98,845	6,146	15,986	323,606	278,010
Total	2,805,511	2,811,163	2,169,172	2,093,188	587,084	612,072	5,561,767	5,516,423
District 3:								
Alabama	160,517	142,790	81,169	74,459	40,097	57,817	281,783	275,066
Arkansas	61,336	59,632	48,083	51,899	16,691	17,535	126,110	129,066
Louisiana	169,732	136,544	22,236	17,834	24,575	17,298	216,543	171,676
Mississippi	83,139	110.212	24,064	29,262	14,953	10,332	122,156	149,806
New Mexico	89,880	105,830	67,439	59,599	2,117	7,908	159,436	173,337
Texas	642,780	702,599	185,757	230,361	31,606	37,788	860,143	970,748
Total	1,207,384	1,257,607	428,748	463,414	130,039	148,678	1,766,171	1,869,699
District 4:								
Colorado	162,835	165,519	90,942	71,136	3,510	66	257,287	236,721
Idaho	32,167	33,647	37,965	40,784	3,722	5,107	73,854	79,538
Montana	79,339	81,065	59,242	59,929	10,362	9,894	148,943	150,888
Utah	75,294	70,968	59,466	47,051	---	---	134,760	118,019
Wyoming	71,329	67,563	40,696	36,804	269	615	112,294	104,982
Total	420,964	418,762	288,311	255,704	17,863	15,682	727,138	690,148
District 5:								
Alaska	5,618	10,017	1,676	3,918	---	315	7,294	14,250
Arizona	[1] 84,849	86,569	[1] 48,971	44,824	[1] 23,782	42,865	[1] 157,602	174,258
California	[1] 931,960	1,115,738	[1] 113,182	141,578	[1] 107,431	115,593	[1] 1,152,573	1,372,909
Hawaii	---	25,405	---	810	---	8,868	---	35,083
Nevada	[1] 21,733	41,251	[1] 9,118	17,579	[1] 2,615	3,033	[1] 33,466	61,863
Oregon	181,922	183.072	36,292	48.372	13,764	16,996	231,978	248,440
Washington	110,208	117,892	84,011	85,631	6,890	9,761	201,109	213,284
Total	[1] 1,336,290	1,579,944	[1] 293,250	342,712	[1] 154,482	197,431	[1] 1,784.022	2,120,087
Total United States	[1] 8,736,062	9,162,614	[1] 4,502,272	4,640,186	[1] 1,435,171	1,514,937	[1] 14,673,505	15,317,737

---

[1] Revised.

TABLE 75.—Shipments of petroleum-asphalt-roofing products in the United States, by PAD districts and States

(Short tons)

District and State	Asphalt cements and fluxes		Emulsified asphalts		Total	
	1960	1961	1960	1961	1960	1961
District 1:						
Connecticut	18,463	16,123	41	19	18,504	16,142
Delaware	1,335	1,645	162	124	1,497	1,769
Florida	119,274	91,867	----------	63	119,274	91,930
Georgia	156,829	167,224	80	28	156,909	167,252
Maine	----------	----------	----------	----------	----------	----------
Maryland and D.C	51,251	52,954	184	87	51,435	53,041
Massachusetts	67,596	68,324	173	176	67,769	68,500
New Hampshire	3	2	14	16	17	18
New Jersey	321,092	287,499	332	257	321,424	287,756
New York	47,782	34,792	489	491	48,271	35,283
North Carolina	45,154	47,316	678	12	45,832	47,328
Pennsylvania	172,095	177,255	609	469	172,704	177,724
Rhode Island	37,260	42,510	20	37	37,280	42,547
South Carolina	55,362	55,713	----------	52	55,362	55,765
Vermont	101	35	8	4	109	39
Virginia	7,656	7,270	55	75	7,711	7,345
West Virginia	37,284	9,338	136	----------	37,420	9,338
Total	1,138,537	1,059,867	2,981	1,910	1,141,518	1,061,777
District 2:						
Illinois	492,032	512,789	189	181	492,221	512,970
Indiana	68,554	104,271	80	56	68,634	104,327
Iowa	9,180	11,172	----------	----------	9,180	11,172
Kansas	25,558	27,180	----------	----------	25,558	27,180
Kentucky	863	646	13	20	876	666
Michigan	54,030	72,553	372	285	54,402	72,838
Minnesota	115,004	123,164	95	143	115,099	123,307
Missouri	173,428	224,723	----------	----------	173,428	224,723
Nebraska	5,654	3,019	----------	----------	5,654	3,019
North Dakota	2,159	391	----------	----------	2,159	391
Ohio	195,921	189,934	3,039	1,260	198,960	191,194
Oklahoma	21,066	23,434	----------	----------	21,066	23,434
South Dakota	2,651	370	----------	----------	2,651	370
Tennessee	63,433	62,114	----------	----------	63,433	62,114
Wisconsin	12,632	9,842	409	372	13,041	10,214
Total	1,242,165	1,365,602	4,197	2,317	1,246,362	1,367,919
District 3:						
Alabama	117,064	123,983	1	547	117,065	124,530
Arkansas	57,808	61,254	----------	----------	57,808	61,254
Louisiana	115,679	111,544	----------	----------	115,679	111,544
Mississippi	9,028	10,169	----------	----------	9,028	10,169
New Mexico	16,096	11,184	----------	----------	16,096	11,184
Texas	227,630	272,265	----------	----------	227,630	272,265
Total	543,305	590,399	1	547	543,306	590,946
District 4:						
Colorado	31,574	41,858	----------	----------	31,574	41,858
Idaho	3,753	342	----------	----------	3,753	342
Montana	6,656	1,163	----------	----------	6,656	1,163
Utah	7,247	1,601	12	----------	7,259	1,601
Wyoming	3,397	1,228	----------	----------	3,397	1,228
Total	52,627	46,192	12	----------	52,639	46,192
District 5:						
Alaska	1,716	1,760	----------	----------	1,716	1,760
Arizona	226	515	----------	----------	226	515
California	404,304	412,581	[1] 1,476	994	[1] 405,780	413,575
Hawaii	5,565	5,284	----------	----------	5,565	5,284
Nevada	382	417	----------	----------	382	417
Oregon	107,646	114,074	----------	1	107,646	114,075
Washington	19,884	33,079	----------	3	19,884	33,082
Total	539,723	567,710	[1] 1,476	998	[1] 541,199	568,708
Total U.S	3,516,357	3,629,770	[1] 8,667	5,772	[1] 3,525,024	3,635,542

---

[1] Revised.

TABLE 76.—Shipments of all other petroleum-asphalt products in the United States, by PAD districts and States

(Short tons)

District and State	Asphalt cements and fluxes		Emulsified asphalts		Total	
	1960	1961	1960	1961	1960	1961
District 1:						
Connecticut	11,917	13,253	458	446	12,375	13,699
Delaware	2,316	2,281	3	6	2,319	2,287
Florida	121,314	97.202	1,260	301	122,574	97,503
Georgia	16,335	43.093	735	947	17,070	44,040
Maine	2,595	2,754	132	106	2,727	2,860
Maryland and D.C	24,422	30,952	697	931	25,119	31,883
Massachusetts	55,322	55,825	1,383	1,273	56,705	57,098
New Hampshire	264	247	49	19	313	266
New Jersey	207,168	233,916	3,444	3,321	210,612	237,237
New York	33,173	34,126	2,351	3,421	35,524	37,547
North Carolina	72,264	72,143	128	7,892	72.392	80,035
Pennsylvania	124,722	116,632	2,656	4,245	127,378	120,877
Rhode Island	9,012	9,262	140	160	9,152	9,422
South Carolina	1,371	2.229	70	782	1,441	3,011
Vermont	2,606	2,303	9	15	2.615	2,318
Virginia	15,990	26,233	617	261	16,607	26,494
West Virginia	22,254	27,348	---	163	22,254	27,511
Total	723,045	769,799	14,132	24,289	737,177	794,088
District 2:						
Illinois	232,560	150,313	9,870	13,042	242,430	163,355
Indiana	96,431	99,042	797	210	97,228	99,252
Iowa	4,614	5,112	1,292	1,499	5,906	6,611
Kansas	14,501	14,470	125	197	14,626	14,667
Kentucky	2,121	1,906	1,359	584	3,480	2,490
Michigan	32,185	37,126	4,811	3,884	36,996	41,010
Minnesota	31,968	29.203	558	399	32,526	29,602
Missouri	49,034	57,368	1,554	1,754	50,588	59,122
Nebraska	2,676	2,033	22	14	2,698	2,047
North Dakota	3,628	554	122	66	3,750	620
Ohio	99.149	91,183	3,158	2,835	102,307	94,018
Oklahoma	22,343	18,402	70	324	22,413	18,726
South Dakota	101	515	---	1	101	516
Tennessee	9,356	7,304	138	140	9,494	7,444
Wisconsin	38,848	31,362	1,274	1,084	40,122	32,446
Total	639,515	545,893	25,150	26,033	664,665	571,926
District 3:						
Alabama	13,606	12,656	1,086	812	14,692	13,468
Arkansas	8,032	8,742	31	17	8,063	8,759
Louisiana	85,230	76,579	3,511	3,162	88,741	79,741
Mississippi	14,193	15,301	616	632	14,809	15,933
New Mexico	2,224	3,734	30	9	2,254	3,743
Texas	74,577	110,996	2,088	1,495	76,665	112,491
Total	197,862	228,008	7,362	6.127	205,224	234,135
District 4:						
Colorado	6,185	5,942	170	55	6,355	5,997
Idaho	375	3,781	41	29	416	3,810
Montana	1,642	46	9	176	1,651	222
Utah	614	301	35	41	649	342
Wyoming	2,111	2,403	12	4	2,123	2,407
Total	10,927	12,473	267	305	11,194	12,778
District 5:						
Alaska	---	46	2	21	2	67
Arizona	1,901	1,448	215	198	2,116	1,646
California	[1] 194,132	104,010	[1] 5,262	5,133	[1] 199,394	109,143
Hawaii	---	---	---	1	---	1
Nevada	424	300	30	92	454	392
Oregon	5,264	13.055	1,328	1,936	6,592	14,991
Washington	27,416	14,803	1,111	1,123	28,527	15,926
Total	[1] 229,137	133,662	[1] 7,948	8,504	[1] 237,085	142.166
Total United States	[1] 1,800,486	1,689,835	[1] 54,859	65,258	[1] 1,855,345	1,755,093

[1] Revised.

TABLE 77.—Shipments of petroleum asphalts and road oil in the United States, by PAD districts and States

(Short tons)

District and State	Asphalts, cements and fluxes	Emulsified asphalts	Cutback alphalts	Total 1961	Total 1960	Change percent	Road oil		Change percent
							1961	1960	
District 1:									
Connecticut	141,416	2,358	43,112	186,886	208,360	−10.3	56	31	80.6
Delaware	11,668	5,550	15,736	32,954	45,688	−27.9	47	62	−24.2
Florida	433,376	25,874	122,596	581,846	632,818	−8.1	1,193	----------	----------
Georgia	458,577	35,041	75,348	568,966	475,341	19.7	----------	----------	----------
Maine	48,924	14,132	107,641	170,697	139,571	22.3	168	54	211.1
Maryland and D.C	315,233	44,372	98,410	458,015	349,354	31.1	67	83	−19.3
Massachusetts	378,766	4,853	51,799	435,418	434,377	0.2	750	517	45.1
New Hampshire	28,276	44	39,879	68,199	89,973	−24.2	40	7	471.4
New Jersey	823,017	30,313	110,047	963,377	891,088	8.1	1,531	933	64.1
New York	618,283	125,107	248,869	992,259	1,038,297	−4.4	1,867	646	189.0
North Carolina	274,436	95,676	144,256	514,368	501,357	2.6	----------	----------	----------
Pennsylvania	676,170	62,714	165,250	904,134	898,281	0.7	6,631	8,356	−20.6
Rhode Island	103,556	197	65,592	169,345	140,759	20.3	99	40	147.5
South Carolina	197,053	77,245	34,509	308,807	313,379	−1.5	----------	----------	----------
Vermont	30,711	202	14,081	44,994	42,896	4.9	----------	----------	----------
Virginia	265,446	34,749	127,842	428,037	335,782	27.5	----------	----------	----------
West Virginia	119,896	8,846	20,201	148,943	175,781	−15.3	76	86	−11.6
Total 1961	4,924,804	567,273	1,485,168	6,977,245	----------	3.9	12,525	----------	15.8
Total 1960	4,827,495	562,816	1,322,791	----------	6,713,102	----------	----------	10,815	----------
District 2:									
Illinois	927,461	35,657	157,592	1,120,710	1,147,174	−2.3	197,880	251,174	−21.2
Indiana	369,458	143,836	130,711	644,005	605,971	6.3	37,808	22,691	66.6
Iowa	305,764	39,956	113,091	458,811	456,120	0.6	30,469	39,528	−22.9
Kansas	233,373	1,808	265,655	500,836	418,171	19.8	20,977	2,970	606.3
Kentucky	156,483	49,044	81,864	287,391	278,396	3.2	11,486	5,656	103.1
Michigan	309,284	74,954	82,890	467,128	538,622	−13.3	24,619	24,804	−0.7
Minnesota	367,072	25,362	247,893	640,327	554,250	15.5	35,711	22,164	61.1
Missouri	435,076	5,965	259,541	700,582	609,941	14.9	74,754	108,256	−30.9
Nebraska	61,843	1,987	66,910	130,740	145,915	−10.4	4,071	3,671	10.9
North Dakota	62,550	47,391	51,030	160,971	205,292	−21.6	2,713	10,231	−73.5
Ohio	691,709	164,805	283,383	1,139,897	1,297,324	−12.1	16,359	17,913	−8.7
Oklahoma	252,656	3,973	137,989	394,618	385,621	2.3	3,535	4,060	−12.9
South Dakota	62,164	6,077	48,999	117,240	111,246	5.4	27,770	28,772	−3.5
Tennessee	283,382	22,165	66,795	372,342	341,982	8.9	----------	15	----------
Wisconsin	204,383	17,442	98,845	320,670	376,769	−14.9	145,883	176,239	−17.2
Total 1961	4,722,658	640,422	2,093,188	7,456,268	----------	−0.2	634,035	----------	−11.7
Total 1960	4,687,191	616,431	2,169,172	----------	7,472,794	----------	----------	718,144	----------

See footnote at end of table.

TABLE 77.—Shipments of petroleum asphalts and road oil in the United States, by PAD districts and States—Continued

(Short tons)

District and State	Asphalts, cements and fluxes	Emulsified asphalts	Cutback asphalts	Total 1961	Total 1960	Change percent	Road oil 1961	Road oil 1960	Change percent
District 3:									
Alabama	279,429	59,176	74,459	413,064	413,540	−0.1	17	125	−86.4
Arkansas	129,628	17,552	51,899	199,079	191,981	3.7		130	
Louisiana	324,667	20,460	17,834	362,961	420,963	−13.8	868	689	26.0
Mississippi	135,682	10,964	29,262	175,908	145,993	20.5			
New Mexico	120,748	7,917	59,599	188,264	177,786	5.9	6,066	7,164	−15.3
Texas	1,085,860	39,283	230,361	1,355,504	1,164,438	16.4	42,201	40,988	3.0
Total 1961	2,076,014	155,352	463,414	2,694,780		7.2	49,152		0.1
Total 1960	1,948,551	137,402	428,748		2,514,701			49,096	
District 4:									
Colorado	213,319	121	71,136	284,576	295,216	−3.6	10,086	15,237	−33.8
Idaho	37,770	5,136	40,784	83,690	78,023	7.3	11,188	16,814	−33.5
Montana	82,274	10,070	59,929	152,273	157,250	−3.2	5,779	8,870	−34.8
Utah	72,870	41	47,051	119,962	142,668	−15.9	11,774	13,626	−13.6
Wyoming	71,194	619	36,804	108,617	117,814	−7.8	15,206	23,881	−36.3
Total 1961	477,427	15,987	255,704	749,118		−5.3	54,033		−31.1
Total 1960	484,518	18,142	288,311		790,971			78,428	
District 5:									
Alaska	11,823	336	3,918	16,077	9,012	78.4	4	2	100.0
Arizona	88,532	43,063	44,824	176,419	[1] 159,944	10.3	5,154	[1] 5,583	−7.7
California	1,632,329	121,720	141,578	1,895,627	[1] 1,757,747	7.8	300,778	[1] 298,035	0.9
Hawaii	30,689	8,869	810	40,368	5,565	625.4			
Nevada	41,968	3,125	17,579	62,672	[1] 34,302	82.7	18,053	13,621	32.5
Oregon	310,201	18,933	48,372	377,506	346,216	9.0	3,526	2,438	44.6
Washington	165,774	10,887	85,631	262,292	249,520	5.1	6,076	1,193	409.3
Total 1961	2,281,316	206,933	342,712	2,830,961		10.5	333,591		4.0
Total 1960	[1] 2,105,150	163,906	293,250		[1] 2,562,306			[1] 320,872	
U.S. total 1961	14,482,219	1,585,967	4,640,186	20,708,372		3.3	1,083,336		−8.0
U.S. total 1960	[1] 14,052,905	1,498,697	4,502,272		[1] 20,053,874			[1] 1,177,355	

---

[1] Revised.

OTHER PRODUCTS

Wax.—The total demand for wax in 1961 was 2.5 percent less than in 1960. Exports for the year declined from 1,333,000 to 1,237,000 barrels and domestic demand (4,390,000 barrels) was down 1.1 percent.

There were no changes in the posted prices on bulk lots of wax in 1961.

Coke.—The total production of petroleum coke in 1961 was 75.3 million barrels, 60 percent of which was nonmarketable catalyst coke used as refinery fuel.

The total demand for marketable petroleum coke in 1961 was 29.6 million barrels compared with 27.4 million in 1960. Exports increased 5.6 percent, and domestic demand was 8.7 percent higher. Coke with a low sulfur content is used in making electrodes required in the electrolic production of aluminum.

Still Gas.—The production of still gas in 1961 totaled 773,415 million cubic feet, 0.8 percent less than in 1960. The heating value of the gas was 989.4 Btu per cubic foot in 1961 compared with 996.8 in 1960 and 1,030 in 1959. Refiners used 98.9 percent of the still gas produced in 1961 as refinery fuel.

Miscellaneous Oils.—Production of miscellaneous oils in 1961 was 28.5 million barrels, a 2.7 million increase for the year. Petroleum refineries produced 92 percent; natural-gas liquid plants, the remainder. Petrochemicals represented 54 percent of the total production in 1961 compared with 58 percent in 1960. The total demand for miscellaneous oils in 1961 was 28.5 million barrels, 12 percent higher than in 1960.

A breakdown of the various type of miscellaneous oils produced is shown on table 82.

Unfinished Oils.—Unfinished oils include all oils, which will be cracked or further distilled, except for the unfinished gasoline part of naphtha distillate. Unfinished oils are ordinarily rerun and become finished products.

TABLE 78.—Salient statistics on wax in the United States, by types, months, and districts

(Thousand barrels)[1]

Month and district	1960											1961[2]										
	Production				Imports (all types)	Exports (all types)	Stocks end of period				Domestic demand (all types)	Production				Imports (all types)	Exports (all types)	Stocks end of period				Domestic demand (all types)
	Microcrystalline	Fully refined	Other	Total			Microcrystalline	Fully refined	Other	Total		Microcrystalline	Fully refined	Other	Total			Microcrystalline	Fully refined	Other	Total	
By months:																						
January	86	226	144	456	1	99	145	315	329	789	343	35	290	150	475	-------	99	151	339	391	881	400
February	55	225	199	479	1	110	128	314	357	799	360	63	293	125	481	-------	108	155	417	322	894	360
March	93	279	139	511	2	105	134	338	310	782	425	70	322	153	545	-------	124	176	449	305	930	385
April	61	251	155	467	-------	93	118	347	317	782	374	56	294	172	522	-------	103	184	486	335	1,005	344
May	76	266	170	512	1	109	117	359	338	814	372	66	280	108	454	-------	105	194	485	311	990	364
June	59	233	170	462	1	116	114	322	339	775	386	53	267	130	450	1	111	190	462	293	945	385
July	75	244	137	456	-------	91	130	345	325	800	340	43	249	206	498	-------	87	172	484	357	1,013	343
August	73	233	194	500	-------	116	151	313	356	820	364	72	255	169	496	-------	95	187	475	377	1,039	375
September	50	233	170	453	-------	118	156	281	331	768	387	48	280	132	460	-------	109	191	491	366	1,048	342
October	59	304	252	615	-------	130	165	304	409	878	375	61	269	114	444	-------	97	197	480	322	999	396
November	54	281	179	514	-------	122	197	302	393	892	378	63	269	161	493	-------	104	204	476	334	1,014	374
December	46	254	171	471	-------	124	165	336	404	905	334	56	253	154	463	1	95	234	470	357	1,061	322
Total	787	3,029	2,080	5,896	6	1,333	165	336	404	905	4,438	686	3,321	1,774	5,781	2	1,237	234	470	357	1,061	4,390

By districts:																					
East Coast	200	1,444	381	2,025	------	(3)	20	79	117	216	(3)	209	1,507	267	1,983	2	457	28	113	100	241	(3)
Appalachian No. 1	13	66	188	267			16	48	23	87		7	52	187	246			15	46	26	87	
Appalachian No. 2	------	34	23	57	------		------	8	------	8		------	47	20	67	------	77	------	7	------	7	
Indiana, Illinois, Kentucky, etc	27	226	103	356			1	16	25	42		7	288	112	407				15	43	58	
Minnesota, Wisconsin, etc	------	------	------	------			------	------	------	------		------	------	------	------			------	------	------	------	
Oklahoma, Kansas, etc	364	17	297	678			80	9	52	141		247	198	142	587			89	78	8	175	
Texas Inland	57	------	------	57	6		20	------	------	20		70	------	------	70	------		23	------	------	23	
Texas Gulf Coast	88	635	530	1,253			20	40	129	189		115	651	519	1,285			31	43	123	197	
Louisiana Gulf Coast	33	30	544	607			3	24	41	68		26	19	510	555	------	578	44	6	35	85	
Arkansas, Louisiana Inland, etc	------	------	------	------			------	------	------	------		------	------	------	------			------	------	------	------	
New Mexico	------	------	------	------			------	------	------	------		------	------	------	------			------	------	------	------	
Rocky Mountain	5	63	14	82	-------		5	11	17	33		5	51	17	73	-------	-------	4	14	22	40	
West Coast	------	514	------	514	-------		------	101	------	101		------	508	------	508	-------	125	------	148	------	148	
Total	787	3,029	2,080	5,896	6	1,333	165	336	404	905	4,438	686	3,321	1,774	5,781	2	1,237	234	470	357	1,061	4,390

---

[1] Conversion factor: 280 pounds to the barrel.

[2] Preliminary figures.

[3] Figures not available.

TABLE 79.—Average monthly refinery prices of 124°–126° white crude scale wax at Pennsylvania refineries

(Cents per pound)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average for year
1957	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
1958	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
1959	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
1960	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.23	6.13	6.24
1961	6.13	6.13	6.13	6.13	6.13	6.13	6.13	6.13	6.13	6.13	6.13	6.13	6.13

Source: Platt's Oil price handbook.

TABLE 80.—Salient statistics of petroleum coke in the United States, by months and districts [1]

(Thousand barrels unless otherwise stated)

Month and district	1960					1961 [2]				
	Production	Yield (percent)	Exports	Stocks, end of period	Domestic demand	Production	Yield (percent)	Exports	Stocks, end of period	Domestic demand
By months:										
January	3,839	1.5	558	5,813	3,173	6,302	2.4	571	4,665	5,453
February	3,531	1.5	396	5,829	3,119	5,607	2.3	427	4,663	5,182
March	3,993	1.6	428	5,954	3,440	6,187	2.5	679	5,126	5,045
April	4,047	1.7	493	5,981	3,527	6,238	2.7	508	5,508	5,348
May	4,146	1.7	528	5,888	3,711	6,090	2.4	626	5,611	5,361
June	5,210	2.1	693	5,834	4,571	6,181	2.6	658	5,553	5,581
July	5,662	2.2	868	5,995	4,633	6,624	2.6	792	5,676	5,709
August	6,252	2.4	431	6,010	5,806	6,712	2.5	633	5,560	6,195
September	5,829	2.4	656	6,039	5,144	5,916	2.4	600	5,474	5,402
October	5,765	2.3	753	5,968	5,083	6.458	2.5	661	5,405	5,866
November	5,726	2.4	654	5,869	5,171	6,348	2.6	501	5,341	5,911
December	6,010	2.4	398	4,387	7,094	6,670	2.5	582	5,316	6,113
	[3]60,010	2.0	6,856	4,387	54,472	[4]75,333	2.5	7,238	5,316	67,166
By districts:										
East Coast	10,076	2.3	(5)	1,113	(5)	13,049	2.9	242	1,698	(5)
Appalachian No. 1	101	.3		-------		180	.5		-------	
Appalachian No. 2	362	1.0		-------		395	1.1	1,307	-------	
Indiana, Illinois, Kentucky, etc	13,747	2.6		652		16,958	3.2		601	
Minnesota, Wisconsin, etc	1,638	3.7		352		1,757	3.9		236	
Oklahoma, Kansas, etc	7,469	2.8		157		8,578	3.2		196	
Texas Inland	1,025	.9		76		1,780	1.6	2,643	82	
Texas Gulf Coast	9,068	1.4		18		13,036	2.0		28	
Louisiana Gulf Coast	3,986	1.6		42		5,092	1.9		36	
Arkansas, Louisiana Inland, etc	1,677	4.2		762		2,017	4.9		615	
New Mexico	28	.3		-------		43	.5		-------	
Rocky Mountain	2,521	2.4		743		2,561	2.4	--------	950	
West Coast	8,312	1.9		472		9,887	2.2	3,046	874	
Total	[3]60,010	2.0	6,856	4,387	54,472	[4]75,333	2.5	7,238	5,316	67,166

[1] Conversion factor: 5.0 barrels to the short ton.
[2] Preliminary figures.
[3] Includes 33,953,000 barrels of nonmarketable catalyst coke.
[4] Includes 44,853,000 barrels of nonmarketable catalyst coke.
[5] Figures not available.

TABLE 81.—Production of still gas in the United States by districts

District	1959		1960		1961[1]	
	Million cubic feet	Equivalent in thousand barrels	Million cubic feet	Equivalent in thousand barrels	Million cubic feet	Equivalent in thousand barrels
East Coast	95,747	16,648	95,297	16,159	91,911	15,908
Appalachian No. 1	10,173	1,813	10,001	1,763	9,269	1,665
Appalachian No. 2	12,217	1,984	11,494	2,050	12,658	1,909
Indiana, Illinois, Kentucky, etc	152,011	25,821	158,043	26,380	162,774	26,984
Minnesota, Wisconsin, North Dakota, and South Dakota	7,480	1,224	9,224	1,531	9,156	1,513
Oklahoma, Kansas, etc	63,002	10,568	66,949	10,959	63,787	10,632
Texas Inland	29,769	5,203	32,434	5,643	31,093	5,194
Texas Gulf Coast	156,640	24,767	176,309	26,113	165,358	23,681
Louisiana Gulf Coast	48,432	7,468	52,753	7,528	54,777	7,675
Arkansas, Louisiana Inland, etc	6,720	1,215	11,856	2,259	11,119	2,062
New Mexico	1,055	187	1,266	223	1,260	242
Rocky Mountain	25,186	4,543	22,308	4,139	20,774	4,039
West Coast	141,242	25,517	131,479	24,733	139,479	26,033
Total	749,674	126,958	779,413	129,480	773,415	127,537

[1] Preliminary figures.

TABLE 82.—Production of miscellaneous finished oils in the United States in 1961, by districts and classes

(Thousand barrels)

District	Absorption	Petrolatum	Specialty oils			Petrochemicals			All other products	Total
			Medicinal	Spray oils	Other	Plasticizers	Polymers	Other		
East Coast	------	------	79	17	489	------	62	3,191	398	4,236
Appalachian No. 1	------	128	11	------	24	------	------	529	44	736
Appalachian No. 2	------	------	------	36	------	------	------	------	------	36
Indiana, Illinois, Kentucky, etc	------	73	------	216	291	97	------	608	426	1,711
Minnesota, Wisconsin, North Dakota, and South Dakota	------	------	------	------	------	------	------	62	------	62
Oklahoma, Kansas, etc	65	410	------	------	294	21	------	255	117	1,162
Texas Inland	437	------	------	------	104	------	99	618	------	1,258
Texas Gulf Coast	71	402	------	20	22	------	991	4,328	1,764	7,598
Louisiana Gulf Coast	763	38	------	------	------	------	220	2,319	2,485	5,825
Arkansas, Louisiana Inland	738	------	------	------	6	------	143	------	18	905
Rocky Mountain and New Mexico	217	------	------	------	32	------	------	------	223	472
West Coast	26	23	57	73	380	62	------	1,651	2,239	4,511
Total: 1961	2,317	1,074	147	362	1,642	180	1,515	13,561	7,714	28,512
1960	1,655	1,074	107	497	2,139	134	1,970	10,258	8,018	25,852

INTERCOASTAL SHIPMENTS

The shipments of crude oil and petroleum products from the gulf coast to the east coast represent most intercoastal shipments. These shipments totaled 719.5 million barrels in 1961. Shipments from the west coast to the east coast were 8.3 million and from the gulf to the west coast, 3.1 million barrels.

Gasoline, distillate fuel oil, and crude oil represent the bulk of the gulf-to-east-coast shipments. Gasoline shipments declined 2.9 million barrels in 1960; shipments of distillate fuel oil increased 15.5 million; crude oil, 15.0 million barrels for the year.

TABLE 83.—Petroleum oils, crude and refined, shipped commercially from gulf and west coasts to east coast ports and from the gulf-coast to west-coast ports, by classes, 1961 by months and year 1960

(Thousand barrels)

Product	1961													1960 total
	January	February	March	April	May	June	July	August	September	October	November	December	Total	
Gulf Coast to East Coast: [1]														
Crude oil	15,020	10,700	17,990	13,420	15,382	11,751	15,142	14,128	13,871	14,267	16,630	17,180	175,481	160,498
Gasoline	18,913	18,140	23,551	19,657	22,296	15,569	21,949	23,050	19,037	18,894	20,848	19,956	241,860	244,727
Kerosine	5,622	5,147	3,430	3,438	2,704	2,174	3,700	4,048	3,315	3,801	4,008	3,978	44,365	44,086
Distillate fuel oil	21,510	22,038	17,168	13,062	13,343	8,523	13,024	16,603	13,769	15,418	15,273	19,270	189,001	173,510
Residual fuel oil	3,881	4,667	5,157	3,985	4,224	2,467	4,312	4,070	3,989	3,100	4,010	3,273	47,135	50,073
Lubricating oils	577	536	502	678	899	511	936	904	672	696	578	473	7,962	7,784
Other products	1,002	1,116	1,028	741	1,122	772	1,166	1,367	1,470	1,619	969	1,302	13,674	13,693
Total	66,525	62,344	68,826	53,981	59,970	41,767	60,229	64,170	56,123	57,795	62,316	65,432	719,478	694,371
West Coast to East Coast:														
Crude oil	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	2,122
Gasoline	--------	--------	158	--------	61	--------	--------	35	--------	--------	--------	--------	254	1,235
Distillate fuel oil	210	211	--------	110	108	109	--------	207	345	102	501	211	2,114	1,687
Residual fuel oil	477	--------	624	210	200	282	413	526	487	247	1,108	128	4,702	5,824
Lubricating oils	67	--------	92	6	22	--------	103	56	25	65	42	50	528	621
Other products	71	--------	95	16	83	83	23	23	74	74	15	188	745	661
Total	825	211	969	342	474	474	539	847	931	488	1,666	577	8,343	12,150
Gulf Coast to West Coast: [1]														
Crude oil	--------	--------	--------	275	--------	135	--------	--------	123	--------	--------	117	650	--------
Gasoline	17	--------	25	404	--------	6	--------	111	33	31	408	[2] 77	[2] 1,112	2,185
Kerosine	--------	--------	--------	--------	--------	--------	--------	--------	30	260	--------	--------	290	67
Lubricating oils	67	84	84	80	11	193	27	90	166	--------	52	184	1,038	1,091
Other products	--------	--------	--------	3	--------	--------	6	--------	--------	--------	26	--------	35	32
Total	84	84	109	762	11	334	33	201	352	291	486	378	3,125	3,375

[1] Source: Geological Survey, U.S. Department of the Interior.

[2] Includes 20,000 barrels of natural gasoline.

FOREIGN TRADE

Foreign trade statistics in this section, as reported by the U.S. Department of Commerce, differ slightly from those used in other sections of this chapter. Imports of crude petroleum and unfinished oils (table 84) are obtained from petroleum-refining companies to be consistent with the refinery balance; therefore, they may differ from the totals reported by the U.S. Department of Commerce. The Bureau of Mines import data excludes all imports from foreign sources to United States territories and possessions and include as exports all petroleum shipments to these territories and possessions from the United States.

Imports.—According to U.S. Department of Commerce data, total imports into the United States, including territories and possessions, in 1961 was 704.4 million barrels. This represents an increase of 17.2 million barrels over 1960. Imports from other countries on the North American Continent increased 37.6 million barrels in 1961; imports from South America declined 22.0 million barrels. Overland receipts from Canada and Mexico are exempt from provisions of the mandatory import-control program, and for the year, imports from these countries increased 67 percent.

Exports.—The total crude petroleum and petroleum products exported to foreign countries from the United States in 1961 was 62.4 million barrels, 14 percent less than in 1960. Exports of residual fuel oil declined 4.7 million barrels, gasoline, 4.2 million barrels; and distillate fuel oil, 3.0 million barrels. Exports of lubricating oils, liquefied petroleum gases, petroleum coke, and crude oil increased 4.8 million barrels over exports in 1960.

TABLE 84.—Petroleum oils, crude and refined, imported into the United States, by months[1]

(Thousand barrels)

Year and class	January	February	March	April	May	June	July	August	September	October	November	December	Total
1960:													
Crude petroleum	28,610	29,730	29,292	33,877	30,571	32,730	31,191	32,768	32,691	31,458	29,980	28,677	371,575
Refined products:													
Gasoline	257	635	467	661	571	1,254	1,037	948	1,396	840	781	943	9,790
Kerosine	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	39	29	68
Distillate fuel oil	1,590	1,095	887	1,520	1,342	1,148	796	773	1,005	897	621	1,097	12,771
Residual fuel oil	26,092	24,562	25,603	19,551	15,590	17,073	13,944	14,942	15,489	15,990	21,623	22,749	233,208
Jet fuel	608	1,415	837	580	1,552	1,289	1,262	880	542	907	1,117	1,383	12,372
Lubricants	----------	1	1	2	2	1	1	1	4	3	2	4	22
Wax	1	1	2	----------	1	1	----------	----------	----------	----------	----------	----------	6
Asphalt	444	196	220	609	292	1,179	636	564	542	507	546	408	6,143
Liquefied gases (incl. ethane)	164	166	119	151	161	133	61	69	96	123	225	163	1,631
Miscellaneous oils	----------	4	----------	----------	----------	7	17	----------	10	9	----------	----------	47
Unfinished oils	1,263	1,215	1,275	1,524	1,200	1,373	1,786	1,292	1,258	1,748	1,448	1,096	16,478
Total refined	30,419	29,290	29,411	24,598	20,711	23,458	19,540	19,469	20,342	21,024	26,402	27,872	292,536
Total crude and refined	59,029	59,020	58,703	58,475	51,282	56,188	50,731	52,237	53,033	52,482	56,382	56,549	664,111
1961:[2]													
Crude petroleum	33,688	28,768	33,276	26,969	33,566	27,186	37,975	34,048	33,147	33,585	30,119	29,221	381,548
Refined products:													
Gasoline	851	645	975	609	1,239	603	1,160	440	1,103	732	908	1,360	10,625
Kerosine	80	56	101	94	235	217	151	210	160	166	224	228	1,922
Distillate fuel oil	2,096	1,054	1,355	891	743	993	1,528	1,123	1,422	1,177	1,364	2,411	16,157
Residual fuel oil	27,866	25,691	22,757	22,944	16,647	12,330	16,871	12,819	14,754	17,376	20,999	24,129	235,183
Jet fuel	331	832	542	785	2,095	1,262	150	1,045	1,733	636	294	503	10,208
Lubricants	1	1	2	----------	2	1	2	----------	1	2	1	1	14
Wax	----------	----------	----------	----------	----------	1	----------	----------	----------	----------	----------	1	2
Asphalt	333	257	301	439	658	1,020	790	738	675	549	538	324	6,622
Liquefied gases (incl. ethane)	166	116	159	159	212	152	112	92	102	213	152	171	1,806
Miscellaneous oils	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
Unfinished oils	1,757	1,465	1,685	1,957	2,071	2,415	3,546	2,313	1,801	2,468	2,018	1,852	25,348
Total	33,481	30,117	27,877	27,878	23,902	18,994	24,310	18,780	21,751	23,319	26,498	30,980	307,887
Total crude and refined	67,169	58,885	61,153	54,847	57,468	46,180	62,285	52,828	54,898	56,904	56,617	60,201	689,435

---

[1] Imports of crude reported to the Bureau of Mines; imports of refined products compiled from records of the U.S. Department of Commerce.

[2] Preliminary figures.

TABLE 85.—Crude petroleum and petroleum products imported for consumption into the United States, by country [1]

(Thousand barrels)

Country	Crude petroleum	Gasoline [2]	Kerosine [3]	Distillate oils [4]	Residual oil [4]	Asphalt	Unfinished oil	Miscellaneous oils [5]	Total
1960									
North America:									
Canada	40,866	2,582	1	131	397	1	93	5	44,076
Cuba	--------	--------	--------	--------	181	1	--------	--------	182
Mexico	766	--------	--------	--------	5,037	--------	--------	5	5,808
Netherlands Antilles	2,021	[6] 8,640	2	4,340	94,310	3,716	3,638	47	[6] 116,714
Trinidad and Tobago	219	[6] 3,494	--------	--------	12,261	19	2,019	--------	[6] 18,012
Other North America	--------	--------	--------	--------	202	--------	--------	--------	202
Total	43,872	[6] 14,716	3	4,471	112,388	3,737	5,750	57	[6] 184,994
South America:									
Brazil	309	--------	--------	--------	107	(7)	--------	--------	416
Columbia	15,489	--------	--------	--------	15	--------	--------	--------	15,504
Venezuela	200,528	4,151	67	5,320	113,686	2,504	7,333	--------	333,589
Other South America	--------	--------	--------	--------	--------	(7)	--------	--------	(7)
Total	216,326	4,151	67	5,320	113,808	2,504	7,333	--------	349,509
Europe:									
Italy	--------	(7)	--------	--------	65	16	178	--------	259
United Kingdom	--------	(7)	(7)	(7)	--------	--------	(7)	6	6
Other Europe	--------	29	--------	1	41	(7)	(7)	13	84
Total	--------	29	(7)	1	106	16	178	19	349
Asia:									
Bahrein	--------	--------	--------	--------	1,436	--------	--------	--------	1,436
Indonesia	28,054	--------	--------	--------	--------	--------	--------	(7)	28,054
Iran	11,170	--------	--------	--------	1	--------	1,267	--------	12,438
Iraq	7,927	--------	--------	--------	--------	--------	--------	--------	7,927
Japan	--------	244	--------	--------	119	--------	1,515	--------	1,878
Kuwait	60,402	151	--------	--------	1,706	--------	4,343	--------	66,602
Qatar [8]	1,408	--------	--------	--------	1	--------	--------	--------	1,409
Saudi Arabia	29,989	37	--------	--------	716	--------	44	--------	30,786
Other Asia	239	22	--------	--------	115	--------	--------	--------	376
Total	139,189	454	--------	--------	4,094	--------	7,169	(7)	150,906
Africa:									
Algeria	284	--------	--------	--------	--------	--------	--------	--------	284
United Arab Republic (Egypt Region)	1,175	--------	--------	--------	--------	--------	--------	--------	1,175
Total	1,459	--------	--------	--------	--------	--------	--------	--------	1,459
Grand total	400,846	[6] 19,350	70	9,792	230,396	6,257	20,430	76	[6] 687,217
Shipments from noncontiguous Territories to the United States: Puerto Rico [9]	--------	5,937	--------	3,003	4,100	--------	--------	--------	13,040
Imports into noncontiguous Territories from foreign countries: Puerto Rico	26,537	1,012	(7)	23	1,287	119	2,789	(7)	31,767
Total net imports into the United States	374,309	[6] 24,275	70	12,772	233,209	6,138	17,641	76	[6] 668,490
1961									
North America:									
Canada	65,819	2,397	1	302	788	(7)	53	4	69,364
Mexico	6,835	--------	--------	--------	5,418	--------	1,481	(7)	13,734
Netherlands Antilles	2,165	6,048	420	5,441	85,866	4,082	6,006	(7)	110,028

See footnotes at end of table.

TABLE 85.—Crude petroleum and petroleum products imported for consumption into the United States, by country[1]—Continued

(Thousand barrels)

Country	Crude petroleum	Gosoline[2]	Kerosine[3]	Distillate oils[4]	Residual oil[4]	Asphalt	Unfinished oil	Miscellaneous oils[5]	Total
1961—Continued									
North America—Con.									
Trinidad and Tobago	172	4,019	-------	198	21,930	6	2,272	-------	28,597
Other North America	-------	-------	-------	1	882	-------	-------	-------	883
Total	74,991	12,464	421	5,942	114,884	4,088	9,812	4	222,606
South America:									
Brazil	1,776	-------	-------	-------	619	-------	-------	-------	2,395
Columbia	10,069	-------	-------	-------	251	-------	-------	-------	10,320
Venezuela	180,387	3,543	4	7,716	110,259	2,639	10,207	(7)	314,755
Other South America	8	-------	-------	-------	-------	1	-------	-------	9
Total	192,240	3,543	4	7,716	111,129	2,640	10,207	(7)	327,479
Europe:									
Italy	-------	-------	-------	-------	3	-------	110	-------	113
United Kingdom	-------	(7)	-------	(7)	17	-------	160	6	183
Other Europe	-------	55	-------	-------	635	-------	-------	10	700
Total	-------	55	-------	(7)	655	-------	270	16	996
Asia:									
Bahrein	-------	-------	-------	-------	385	-------	-------	-------	385
Indonesia	22,780	-------	-------	-------	-------	-------	-------	-------	22,780
Iran	22,203	-------	-------	-------	-------	-------	-------	-------	22,203
Iraq	9,297	-------	-------	-------	-------	-------	-------	-------	9,297
Japan	-------	35	-------	-------	170	-------	2,044	-------	2,249
Kuwait	51,366	(7)	-------	-------	2	-------	3,331	-------	54,699
Qatar[8]	12,999	-------	-------	-------	70	-------	128	-------	13,197
Saudi Arabia	24,211	188	-------	-------	2,081	-------	10	-------	26,490
Other Asia	295	12	-------	-------	86	-------	-------	-------	393
Total	143,151	235	-------	-------	2,794	-------	5,513	-------	151,693
Africa:									
United Arab Republic, (Egypt Region)	1,586	-------	-------	-------	-------	-------	-------	-------	1,586
Other Africa	(7)	-------	-------	3	6	-------	-------	-------	9
Total	1,586	-------	-------	3	6	-------	-------	-------	1,595
Oceania	-------	16	-------	-------	-------	-------	-------	-------	16
Grand total	411,968	16,313	425	13,661	229,468	6,728	25,802	20	704,385
Shipments from noncontiguous Territories to the United States: Puerto Rico[9]	-------	8,444	-------	2,629	4,834	-------	-------	-------	15,907
Imports into noncontiguous Territories from foreign countries: Puerto Rico	24,962	704	-------	2	1,341	101	7,292	-------	34,402
Total net imports into the United States	387,006	24,053	425	16,288	232,961	6,627	18,510	20	685,890

---

[1] Compiled by Mae B. Price and Elsie D. Jackson, of the Bureau of Mines, from records of the Bureau of the Census, U.S. Department of Commerce.

[2] Includes jet fuel, liquefied gases and naphtha, but excludes benzol (1960: [6]907,649; 1961: 460,839 barrels).

[3] Includes quantities imported free for supplies of vessels and aircraft; assumed to be commercial jet fuel by Bureau of Mines.

[4] Includes some quantities imported free for manufacture in bond and export and for vessels and aircraft.

[5] Include some quantities imported free for supplies of vessels and aircraft.

[6] Revised figure.

[7] Less than 1,000 barrels.

[8] Assumed source; classified in import statistics under "Arabia Peninsular States. n.e.c."

[9] As reported to Bureau of Mines by shipping companies.

Source: Bureau of the Census.

TABLE 86.—Petroleum oils, crude and refined, shipped from the United States, including shipments to Territories and possessions, by classes and months[1]

Year and class	January	February	March	April	May	June	July	August	September	October	November	December	Total
1960:													
Crude petroleum	264	298	260	270	127	436	248	86	234	352	----------	512	3,087
Refined products:													
Gasoline[2]	997	878	1,224	1,613	1,470	1,272	1,102	1,096	1,185	1,056	890	673	13,456
Kerosine	157	43	78	72	38	21	25	156	7	19	11	62	689
Distillate fuel oil	791	1,012	983	778	1,160	1,171	983	761	482	579	558	639	9,897
Residual fuel oil	1,728	1,685	1,767	1,750	1,484	1,967	875	1,888	1,357	1,175	1,304	1,515	18,495
Jet fuel	57	----------	1	----------	----------	1	20	4	10	----------	20	----------	113
Lubricants	1,193	1,042	1,328	1,426	1,315	1,558	1,477	1,090	1,257	1,385	1,357	1,383	15,811
Wax	99	110	105	93	109	116	91	116	118	130	122	124	1,333
Coke	558	396	428	493	528	693	868	431	656	753	654	398	6,856
Asphalt	34	59	90	76	87	56	66	121	111	72	82	70	924
Liquified gases (incl. ethane)	232	206	214	246	219	222	262	251	240	244	295	357	2,988
Miscellaneous oils	19	21	22	23	19	21	26	20	20	20	21	25	257
Total refined	5,865	5,452	6,240	6,570	6,429	7,098	5,795	5,934	5,443	5,433	5,314	5,246	70,819
Total crude and refined	6,129	5,750	6,500	6,840	6,556	7,534	6,043	6,020	5,677	5,785	5,314	5,758	73,906
1961:[3]													
Crude petroleum	135	295	339	316	229	435	178	309	130	190	400	271	3,227
Refined products:													
Gasoline[2]	1,044	519	542	1,134	552	1,060	627	782	856	620	916	297	8,949
Kerosine	38	22	30	20	18	15	4	24	11	16	17	15	230
Distillate fuel oil	708	329	445	563	822	699	580	359	346	749	602	746	6,948
Residual fuel oil	1,176	1,014	1,322	1,253	1,630	1,125	805	1,398	880	1,194	954	1,286	14,037
Jet fuel	2	6	16	24	----------	15	1	30	1	26	1	----------	122
Lubricants	1,045	1,508	1,587	1,374	1,545	1,326	1,527	1,721	1,212	1,404	1,504	1,236	16,989
Wax	99	108	124	103	105	111	87	95	109	97	104	95	1,237
Coke	571	427	679	508	626	658	792	633	600	661	501	582	7,238
Asphalt	26	45	45	63	58	66	54	41	38	57	63	75	631
Liquefied gases (incl. ethane)	282	298	296	219	313	263	261	338	308	333	327	303	3,541
Miscellaneous oils	23	23	22	18	21	19	22	22	19	15	21	20	245
Total refined	5,014	4,299	5,108	5,279	5,690	5,357	4,760	5,443	4,380	5,172	5,010	4,655	60,167
Total crude and refined	5,149	4,594	5,447	5,595	5,919	5,792	4,938	5,752	4,510	5,362	5,410	4,926	63,394

[1] Compiled from records of U.S. Department of Commerce.
[2] Includes benzol, naphtha, natural gasoline, and antiknock compounds.
[3] Preliminary figures.

TABLE 87.—Crude petroleum and petroleum products exported from the United States by countries of destination, and shipments to and exports from Territories and possessions [1]

(Thousand barrels)

Country	Crude petroleum	Gasoline [2]	Kerosine	Distillate oil	Residual oil	Lubricating oil [2]	Asphalt	Liquefied petroleum gases	Wax	Coke	Petrolatum	Miscellaneous products	Total
1960													
North America:													
Canada	(3)	2,685	196	1,865	4,004	1,232	74	125	148	2,225	13	55	12,622
Cuba	(3)	34	-------	-------	-------	130	(3)	29	31	-------	2	8	234
El Salvador	-------	5	(3)	-------	40	21	1	-------	7	-------	1	2	77
Mexico	(3)	2,299	63	224	553	132	283	2,663	173	(3)	12	26	6,428
Netherlands Antilles	-------	1,856	-------	-------	-------	16	(3)	-------	(3)	-------	(3)	(3)	1,872
Other North America	-------	116	14	118	324	310	79	73	76	(3)	7	15	1,132
Total	(3)	6,995	273	2,207	4,921	1,841	437	2,890	435	2,225	35	106	22,365
South America:													
Argentina	-------	(3)	129	(3)	-------	23	1	91	1	-------	(3)	(3)	245
Brazil	-------	57	7	38	-------	[4] 1,294	1	-------	89	47	12	2	1,547
Chile	-------	(3)	(3)	-------	305	219	[4] 88	-------	24	-------	1	10	[4] 647
Colombia	-------	4	-------	(3)	-------	187	1	(3)	147	-------	3	7	349
Peru	-------	338	-------	-------	40	126	1	-------	20	-------	1	9	535
Venezuela	-------	289	(3)	(3)	-------	224	4	(3)	15	(3)	3	8	543
Other South America	-------	6	(3)	1	-------	173	32	(3)	38	-------	2	13	265
Total	-------	694	136	39	345	[4] 2,246	[4] 128	91	334	47	22	49	[4] 4,131
Europe:													
Belgium-Luxembourg	-------	40	1	-------	-------	785	1	-------	12	276	3	10	1,128
France	568	566	-------	(3)	106	53	(3)	(3)	42	251	4	1	1,591
Germany, West	-------	32	12	5	271	463	(3)	(3)	111	163	10	4	1,071
Italy	-------	985	(3)	-------	249	438	2	1	15	474	3	17	2,184
Netherlands	-------	209	1	988	184	515	(3)	-------	40	99	12	9	2,057
Sweden	-------	19	(3)	-------	127	398	1	(3)	8	36	3	9	601
United Kingdom	433	523	72	196	1,628	1,236	1	(3)	75	77	31	1	4,273
Other Europe	-------	479	(3)	46	58	856	7	-------	52	806	8	19	2,331
Total	1,001	2,853	86	1,235	2,623	4,744	12	1	355	2,182	74	70	15,236

Asia:													
India	--------	59	1	--------	--------	873	8	(3)	1	48	18	7	1,015
Indonesia	--------	395	--------	160	--------	169	1	--------	1	--------	5	1	732
Japan-Nansei and Nanpo Islands	2,086	298	5	[4] 6,059	10,313	1,569	8	1	40	2,160	28	114	[4] 22,681
Malaya and Singapore	--------	(3)	--------	--------	--------	89	(3)	--------	1	--------	4	5	99
Philippines	--------	37	53	17	--------	348	11	--------	8	--------	10	16	500
Turkey	--------	146	1	--------	--------	392	5	--------	2	--------	(3)	8	554
Other Asia	--------	210	(3)	--------	--------	1,049	25	(3)	100	40	17	62	1,503
Total	2,086	1,145	60	[4] 6,236	10,313	4,489	58	1	153	2,248	82	213	[4] 27,084
Africa:													
Congo, Republic of the, and Ruanda-Urundi [5]	--------	4	1	--------	--------	59	6	--------	--------	(3)	(3)	3	73
Union of South Africa	--------	13	(3)	--------	100	479	97	(3)	38	--------	25	18	770
United Arab Republic (Egypt Region)	--------	25	--------	--------	--------	256	(3)	--------	(3)	--------	(3)	19	300
Western Africa, n.e.c.[6]	--------	42	1	8	91	11	6	--------	--------	--------	(3)	1	160
Other Africa	--------	541	9	(3)	6	301	38	(3)	5	102	8	19	1,029
Total	--------	625	11	8	197	1,106	147	(3)	43	102	33	60	2,332
Oceania:													
Australia	--------	1	2	3	291	727	1	--------	11	54	9	2	1,101
French Pacific Islands	--------	63	19	114	1	6	(3)	2	--------	--------	--------	(3)	205
New Zealand	--------	4	1	--------	--------	155	1	3	3	--------	3	(3)	170
Other Oceania	--------	(3)	2	1	4	(3)	4	1	--------	--------	--------	(3)	12
Total	--------	68	24	118	296	888	6	6	14	54	12	2	1,488
Grand total	3,087	12,380	590	[4] 9.843	18,695	[4] 15,314	[4] 788	2,989	1,334	6,858	258	500	[4] 72,636
Shipments from the United States to Territories and possessions:													
Puerto Rico	--------	171	89	(3)	(7)	95	126	(7)	(7)	(7)	(7)	6	487
Wake	--------	718	(3)	39	(7)	(3)	1	(7)	(7)	(7)	(7)	(3)	758
Other	--------	252	16	138	(7)	8	9	(7)	(7)	(7)	(7)	(3)	423
Total	--------	1,141	105	177	(7)	103	136	(7)	(7)	(7)	(7)	6	1,668
Exports from Territories to foreign countries: Puerto Rico	--------	66	7	123	202	(3)	1	(3)	--------	--------	--------	(3)	399
Total net shipments from the United States	3,087	13,455	688	[4] 9,897	18,493	[4] 15,417	[4] 923	2,989	1,334	6,858	258	506	[4] 73,905
1961:													
North America:													
Canada	20	1,072	57	998	2,997	1,376	52	99	148	1,515	13	54	8,401
El Salvador	--------	7	--------	--------	--------	23	2	1	6	--------	1	2	42
Mexico	133	395	2	151	430	209	123	2,902	164	2	12	25	4,548
Netherlands Antilles	--------	2,930	--------	--------	--------	15	(3)	(3)	1	--------	1	(3)	2,947
Other North America	--------	69	11	82	33	325	30	90	67	--------	8	17	732
Total	153	4,473	70	1,231	3,460	1,948	207	3,092	386	1,517	35	98	16,670

TABLE 87.—Crude petroleum and petroleum products exported from the United States by countries of destination, and shipments to and exports from Territories and possessions [1]—Continued

(Thousand barrels)

Country	Crude petroleum	Gasoline [2]	Kerosine	Distillate oil	Residual oil	Lubricating oil [2]	Asphalt	Liquefied petroleum gases	Wax	Coke	Petrolatum	Miscellaneous products	Total
South America:													
Argentina		(3)		(3)	4	52	2	346	2		(3)	1	407
Brazil		27	6	16		1,155	1	11	52	61	7	1	1,337
Chile		(3)	1		11	216	32		27	(3)	1	13	301
Colombia	1	15	(3)	(3)		222	1	(3)	137		4	8	388
Peru		1				131	1		15		1	8	157
Venezuela		181	1			134	5	1	22	1	5	2	352
Other South America		17	(3)	(3)		115	2		32		1	10	177
Total	1	241	8	16	15	2,025	44	358	287	62	19	43	3,119
Europe:													
Belgium-Luxembourg		128	1			918	1	(3)	16	344	3	7	1,418
Denmark		8		75	3	187	(3)	1	9	1	1	2	287
France	355	619	(3)	1	83	52	3	4	45	272	6	2	1,442
Germany, West		78	10	1	(3)	407	(3)	13	98	324	9	2	942
Greece		149			48	104	(3)		1		(3)	2	304
Italy		259	1		103	669	7	10	46	598	6	7	1,706
Netherlands		284	2		416	467	1	3	47	261	7	8	1,496
Norway		1	(3)	(3)		60	(3)	(3)	2	592	2	4	661
Sweden		32				419	1	(3)	14	40	2	12	520
United Kingdom	437	456	68	173	914	1,429	5	37	90	69	27	2	3,707
Other Europe		30	(3)	(3)	5	584	9	(3)	50	285	9	8	980
Total	792	2,044	82	250	1,572	5,296	27	68	418	2,786	72	56	13,463
Asia:													
India		61	1			1,014	7	(3)	2	79	15	6	1,185
Indonesia		369				324	1	(3)	2	1	11	11	719
Japan-Nansei and Nanpo Islands	2,218	403	2	5,130	8,800	2,037	9	16	27	2,689	31	111	21,473
Malaya and Singapore		2		1		90			2		4	2	101
Philippines		36	(3)	4		464	6		14		10	16	550
Turkey		136				361	(3)		2	1	(3)	26	526
Other Asia	55	92	10	66	1	1,115	20	(3)	57	37	16	55	1,524
Total	2,273	1,099	13	5,201	8,801	5,405	43	16	106	2,807	87	227	26,078

Africa:													
Congo, Republic of the, and Ruanda-Urundi	--------	4	2	--------	--------	60	7	--------	--------	--------	(3)	1	74
Union of South Africa	--------	88	(3)	--------	1	489	112	--------	22	--------	14	20	746
United Arab Republic (Egypt Region)	--------	5	--------	--------	3	215	(3)	--------	(3)	--------	1	5	229
Western Africa, n.e.c.	--------	24	(3)	13	35	13	1	--------	--------	--------	1	1	88
Other Africa	--------	117	5	2	--------	232	58	5	7	99	7	17	549
Total	--------	238	7	15	39	1,009	178	5	29	99	23	44	1,686
Oceania:													
Australia	--------	37	3	10	129	747	1	2	9	--------	6	2	946
French Pacific Islands	--------	56	24	113	7	4	(3)	4	(3)	--------	--------	6	214
New Zealand	--------	21	2	(3)	--------	172	1	3	3	(3)	4	(3)	206
Other Oceania	--------	(3)	1	2	--------	1	9	1	--------	--------	--------	(3)	14
Total	--------	114	30	125	136	924	11	10	12	(3)	10	8	1,380
Grand total	3,219	8,209	210	6,838	14,023	16,607	510	3,549	1,238	7,271	246	476	62,396
Shipment from the United States to Territories and possessions:													
Puerto Rico	--------	5	(3)	(3)	(7)	115	147	(7)	(7)	(7)	(7)	7	274
Virgin Islands	--------	49	17	51	(7)	4	[8] 5	(7)	(7)	(7)	(7)	(3)	126
Wake	--------	699	(3)	19	(7)	(3)	(3)	(7)	(7)	(7)	(7)	(3)	718
Other	--------	23	5	25	(7)	5	4	(7)	(7)	(7)	(7)	(3)	62
Total	--------	776	22	95	(7)	124	156	(7)	(7)	(7)	(7)	7	1,180
Exports from Territories to foreign countries: Puerto Rico	--------	2	(3)	3	2	(3)	(3)	8	--------	--------	(3)	(3)	15
Total net shipments from the United States	3,219	8,983	232	6,930	14,021	16.731	666	3,541	1,238	7,271	246	483	63,561

---

[1] Compiled by Mae B. Price and Elsie D. Jackson, of the Bureau of Mines, from records of the Bureau of the Census. [2] Includes naphtha but excludes benzol: 1960—561,000 barrels; 1961—1,106,000 barrels. [3] Less than 1,000 barrels. [4] Revised figure. [5] Effective July 1, 1960; formerly Belgian Congo. [6] Effective July 1, 1960; formerly French West Africa and Republic of Togo. [7] Not separately classified. [8] Adjusted by Bureau of Mines.

Source: Bureau of the Census.

WORLD SUPPLY AND DEMAND

PETROLEUM[5]

World petroleum supply and demand continued upward during 1961. Free-world production of crude oil reached an alltime record of 6,821 million barrels, 355 million barrels above 1960. In the Sino-Soviet bloc, crude output increased 159 million barrels during the year for a total estimated production of 1,367 million barrels. The United States furnished 38 percent of free world crude output in 1961; Venezuela, 16 percent; and the Middle East, 30 percent. About 89 percent of Sino-Soviet bloc crude output in 1961 was in the U.S.S.R. Countries contributing most to expansion of world production during the year were, in order of importance, the U.S.S.R., Algeria (French Sahara), Saudi Arabia, the United States, and Iran.

Movements of crude petroleum within the free world in 1961 increased 11 percent. The excess of imports over exports and re-exports reflects crude shipments from the Sino-Soviet bloc, mainly the U.S.S.R., to the free world. These shipments, estimated at 102 million barrels for 1961, went chiefly to Western Europe. Crude receipts into Western Europe rose by 191 million barrels during the year, mainly in West Germany, France, Italy, the United Kingdom, and the Netherlands. In the Far East, Japanese crude imports rose 41 million barrels. On the export side, Middle East crude shipments increased 145 million barrels in 1961, and French Sahara shipments, 54 million barrels. In the Western Hemisphere, Canadian shipments were up 23 million barrels, mainly to the United States, and Venezuela shipments were up 13 million barrels.

Free-world output of refined products increased 427 million barrels in 1961, attaining a total of 7,209 million barrels. Among the major products, gasoline was 32 percent of the total; residual fuel oil, 27 percent; and distillate fuel oil, 20 percent. The United States supplied 43 percent of free world output; Western Europe, 21 percent, and South America, 14 percent. Refinery output in the Sino-Soviet bloc is estimated at 1,292 million barrels for the year, or 150 million barrels more than in 1960. About 83 percent of bloc output was in the U.S.S.R. The major area of expansion of refined products in 1961 was Western Europe, where there was a gain of 203 million barrels, mainly in West Germany, the United Kingdom, Italy, France, and the Netherlands. In the Far East, Japanese output rose 36 million barrels. In the Western Hemisphere, South American output rose 83 million barrels, mainly in Trinidad, the Netherlands Antilles, Brazil, and Argentina. In Canada output increased 17 million barrels, and in the United States, 38 million barrels.

Movements of refined products within the free world in 1961 increased 5 percent. Indicated imports of 1,303 million barrels are understated by about 200 million barrels owing to the absence of complete data in many countries on in-bond deliveries for re-export, bunkers and military use. Also, import data are lacking for a number of areas of small consumption whose imports for domestic use are probably appreciable in the aggregate. The most significant increase in product movements during the year was intra-area shipments within Western Europe. In the Western Hemisphere, Trinidad and Venezuela expanded their exports to other Western Hemisphere countries. Movements of refined products from the Sino-Soviet bloc in 1961 are estimated at 102 million barrels.

---

[5] J. V. Hightower, Commodity-Industry Analyst.

Domestic demand for products in the free world rose by 420 million barrels in 1961 to a total of 7,156 million barrels. The United States remained the leading consuming area accounting for 50 percent of the total. Western Europe followed with 23 percent. In the Sino-Soviet bloc, domestic demand rose by 132 million barrels to an estimated 1,190 million barrels, of which some 80 percent was consumed in the U.S.S.R. Western Europe continued to show the greatest expansion; demand rose 207 million barrels during the year, mainly in West Germany, France, Italy, and the United Kingdom. About half of the increase in Western Europe demand was in residual fuel oil; the rest was distributed about equally between gasoline and distillate fuel oil. There were also significant increases in demand in Argentina, and Brazil, mainly for residual fuel oil and gasoline. In the Far East, Japanese demand continued to rise at a spectacular rate, expanding by 58 million barrels, mainly residual fuel oil. In the United States in 1961, domestic demand rose 31 million barrels.

The indicated new supply of refined products in the free world in 1961, including refinery fuel and losses, is estimated at 7,521 million barrels, 6 percent over estimated new supply in 1960. New supply is derived from the calculated free-world output of refined products plus imports of refined products from the Sino-Soviet bloc. Added to this are 160 million barrels of natural-gas liquids produced in the United States and used directly for chemicals and fuels, but not included in refinery output; also an estimated 50 million barrels of similar natural-gas liquids produced elsewhere in the free world. The gap of 366 million barrels between the estimated new supply and demand in the free world in 1961 is attributed to understated imports of refined products and the calculation of demand in a number of countries on an apparent basis with no account taken of stock changes.

TABLE 88.—World production of crude petroleum by countries [1]

(Thousand barrels [2])

Country	1957	1958	1959	1960	1961 [3]
North America:					
Canada	181, 848	165, 496	184, 778	189, 534	220, 461
Cuba [4]	395	344	192	[5] 108	[5] 80
Mexico	88, 266	93, 533	96, 393	99, 049	106, 784
Trinidad	34, 064	37, 355	40, 919	42, 357	45, 537
United States	2, 616, 901	2, 449, 016	2, 574, 590	2, 574, 933	2, 621, 758
Total	2, 921, 474	2, 745, 744	2, 896, 872	2, 905, 981	2, 994, 620
South America:					
Argentina	33, 952	35, 829	44, 710	64, 232	85, 012
Bolivia	3, 575	3, 435	3. 170	3, 574	2, 989
Brazil	10, 106	18, 919	23, 590	29, 613	34, 815
Chile	4, 337	5, 568	6, 428	7, 231	9, 263
Colombia	45, 744	46, 901	53, 576	55, 770	52, 899
Ecuador	3, 191	3, 108	2, 759	2, 730	2, 926
Peru	19, 222	18, 732	17, 770	19, 255	19, 371
Venezuela	1, 014, 457	950, 796	1, 011, 452	1, 041, 708	1, 065, 790
Total	1, 134, 584	1, 083, 288	1, 163, 455	1, 224, 113	1, 273, 065

See footnotes at end of table.

TABLE 88.—World production of crude petroleum by countries [1]—Continued

Country	1957	1958	1959	1960	1961 [3]
Europe:					
Albania	3,269	2,690	3,504	4,857	[5] 5,004
Austria	21,955	19,548	16,946	16,874	16,237
Bulgaria	2,095	1,632	1,402	1,460	[5] 1,510
Czechoslovakia	732	718	834	929	1,017
France	10,157	9,983	11,594	14,233	15,578
Germany, West	28,698	32,119	36,981	40,076	44,960
Hungary	5,150	6,325	7,897	9,270	11,102
Italy	8,593	10,531	11,551	13,613	13,434
Netherlands	10,623	11,306	12,367	13,378	14,271
Poland	1,341	1,298	1,277	1,442	1,503
Rumania	83,327	84,490	83,492	85,712	86,321
U.S.S.R. [6]	717,926	826,477	945,766	1,079,371	1,211,800
United Kingdom	606	591	612	649	810
Yugoslavia	2,797	3,267	4,188	6,671	9,479
Total [6]	897,269	1,010,975	1,138,411	1,288,535	1,433,026
Asia:					
Bahrain	11,691	14,823	16,473	16,500	16,444
Burma	2,958	3,454	3,967	4,078	4,194
China [5]	5,000	6,000	15,330	24,959	48,743
India	3,241	3,258	3,377	3,370	3,356
Indonesia	114,151	118,711	139,038	152,988	156,845
Iran	263,134	301,361	344,800	385,748	431,653
Iraq	163,498	266,125	311,193	353,833	365,483
Israel	394	642	925	932	1,000
Japan	2,243	2,563	2,852	3,678	4,590
Kuwait	416,045	509,654	504,855	594,278	600,226
Kuwait-Neutral Zone	23,259	29,469	42,438	49,829	64,405
Pakistan	2,200	2,272	2,333	2,636	2,819
Qatar	50,798	63,412	61,431	63,088	64,386
Sarawak and Brunei	41,821	39,551	40,072	34,005	30,551
Saudi Arabia	362,121	370,486	399,821	456,453	508,269
Taiwan (Formosa)	17	15	13	14	17
Turkey	2,159	2,379	2,700	2,624	3,075
Total [6]	1,464,730	1,734,175	1,891,618	2,149,013	2,306,056
Africa:					
Algeria	101	[7] 3,315	[7] 9,686	[7] 67,613	[7] 123,122
Angola	71	358	361	477	757
Congo, Republic of (formerly French)	----------	----------	----------	365	724
Gabon, Republic of	1,207	3,550	5,295	5,626	5,446
Libya	----------	----------	----------	----------	6,642
Morocco: Southern zone	566	560	712	695	596
Nigeria	----------	1,970	4,067	6,552	16,802
Senegal	----------	----------	----------	12	16
United Arab Republic (Egypt)	16,157	21,960	21,303	23,968	26,032
Total	18,102	31,713	41,424	105,308	180,137
Oceania:					
Netherlands New Guinea	2,279	1,850	1,656	1,538	1,082
New Zealand	6	5	5	5	----------
Total	2,285	1,855	1,661	1,543	1,082
World total	6,438,444	6,607,750	7,133,441	7,674,493	8,187,986

---

[1] This table incorporates some revisions.

[2] 42-gallon barrels.

[3] Preliminary figures.

[4] Natural naphtha and gas oil.

[5] Estimate.

[6] U.S.S.R. in Asia (including Sakhalin) included with U.S.S.R. in Europe.

[7] Including Sahara.

Source: Compiled by Pearl J. Thompson, Division of Foreign Activities.

TABLE 89.—World supply and demand of crude petroleum and refined products

(Thousands of barrels)

Country	1960								
	Crude and topped crude					Refined products			
	Production	Imports	Exports and re-exports	Stock change, other demand, and loss	Total[1] refinery input / Total[2] refinery output	Imports	Exports and re-exports	Domestic demand (incl. bunkers)[3]	Bunkers all flags (as reported)
North America:									
Canada	189,534	125,560	42,235	−4,515	280,560	35,298	2,295	[4] 306,865	[5] 6,570
Mexico	99,049	-----	1,046	−1,893	107,278	7,895	6,447	108,726	-----
United States (incl. Alaska and Hawaii)	2,574,933	371,575	3,087	−9,113	3,119,327	292,536	70,819	[4] 3,535,805	78,859
Total	2,863,516	497,135	46,368	−15,521	3,507,165	335,729	79,561	3,951,396	-----
Central America and Caribbean:									
Costa Rica	-----	-----	-----	-----	-----	1,226	-----	1,226	-----
Cuba	[5] 108	22,869	-----	−518	[5] 23,495	[5] 6,689	-----	30,184	166
Dominican Republic	-----	-----	-----	-----	-----	2,491	-----	2,491	-----
El Salvador	-----	-----	-----	-----	-----	1,511	-----	[4] 1,464	-----
Guatemala	-----	-----	-----	-----	-----	3,570	-----	3,570	-----
Haiti	-----	-----	-----	-----	-----	668	-----	668	-----
Honduras	-----	-----	-----	-----	-----	1,495	-----	1,495	-----
Jamaica	-----	-----	-----	-----	-----	5,423	-----	5,423	1,203
Nicaragua	-----	-----	-----	-----	-----	1,396	-----	1,396	-----
Panama, Canal Zone	-----	-----	-----	-----	-----	8,045	1,994	6,051	5,448
Panama, Republic of	-----	-----	-----	-----	-----	2,649	-----	2,649	-----
Puerto Rico	-----	26,469	-----	+158	29,140	5,665	13,485	21,320	-----
Total	108	49,338	-----	−360	52,635	40,828	15,479	77,937	-----
South America:									
Argentina	64,232	22,982	-----	+1,511	85,703	13,575	32	[4] 89,007	1,445
Bolivia	3,574	-----	1,088	+225	2,261	122	44	[4] 2,219	-----
Brazil	29,613	41,801	4,452	−234	67,196	33,437	384	[4] 99,819	-----
British Guiana	-----	-----	-----	-----	-----	1,589	-----	1,589	-----
Chile	7,231	3,584	-----	−49	10,864	6,310	-----	[4] 17,540	104
Colombia	55,770	-----	31,332	−408	26,548	1,032	3,854	[4] 19,567	1,200
Ecuador	2,730	1,459	-----	−55	4,244	248	-----	4,492	-----

See footnotes at end of table.

TABLE 89.—World supply and demand of crude petroleum and refined products—Continued

(Thousands of barrels)

Country	1960								
	Crude and topped crude					Refined products			
	Production	Imports	Exports and re-exports	Stock change, other demand, and loss	Total [1] refinery input / Total [2] refinery output	Imports	Exports and re-exports	Domestic demand (incl. bunkers) [3]	Bunkers all flags (as reported)
South America—Continued									
Netherlands Antilles	------	264,928	1,289	+4,031	279,253	18,206	242,018	[6] 55,441	22,088
Paraguay	------	------	------	------	------	811	------	[4] 673	------
Peru	19,255	------	2,528	+185	16,748	4,212	3,219	[4] 18,130	242
Surinam	------	------	------	------	------	1,090	------	1,090	------
Trinidad	42,357	40,218	5,073	−4,398	82,341	1,279	62,384	[4] [6] 17,198	13,823
Uruguay	------	9,267	------	−222	9.489	1,782	------	11,271	1,825
Venezuela	1,041,708	------	730,962	−12,180	330,105	701	253,506	[4] 56,593	17,064
Total	1,266,470	384,239	776,724	−11,594	914,752	84,394	565,441	394,629	------
Western Europe:									
Austria	16,874	3,885	6,908	+211	14,171	8,676	1,095	[4] 20,890	------
Belgium and Luxembourg	------	50,493	------	−1,183	52,217	24,716	19,743	[4] 52,946	4,319
Denmark	------	38	------	−158	[5] 196	38,707	126	[4] 37,468	1,701
Finland	------	8,391	------	−340	8,731	11,715	44	20,402	------
France	14,233	231,427	6	+888	244.973	17,808	52,247	[4] 204,177	11,725
Germany, West	40,076	163,010	------	−1,524	204,610	46,360	20,230	[4] 229,288	16,156
Greece	------	12,764	------	−40	12,804	4,567	------	[4] 18,928	3,530
Iceland	------	------	------	------	------	2,795	------	2,795	------
Ireland	------	10,671	------	−228	10,899	3,388	809	[4] 9,610	728
Italy	13,613	211,971	3,529	−3,819	236,513	12,551	50,284	[4] 162,628	25,825
Netherlands	13,378	120,658	60	−3,543	149,653	37,214	85,186	[4] 91,900	20,740
Norway	------	1,540	------	+659	[5] 881	25,769	------	[4] 27,450	2,366
Portugal	------	9,646	------	−567	10,213	4,559	2,088	[4] 13.027	3,494
Spain	------	29,984	------	+78	30,705	2,379	1,415	[4] 34,987	1,533
Sweden	------	19,381	------	−829	20,210	77,632	965	96,877	3,534
Switzerland	------	------	------	------	------	28,439	32	[4] 29,206	------
United Kingdom	649	319,039	------	−1,586	321,274	113,406	68,912	[4] 344,238	28,119
Yugoslavia	6,671	3,194	------	+362	9,503	1,415	614	10,304	------
Total	105,494	1,196,092	10,503	−11,619	1,327,553	462,096	303,790	1,407,121	------

Middle East:									
Aden	-----	31,332	-----	+308	31,024	12,385	16,955	[6]26,454	26,436
Bahrain	16,500	59,599	-----	+169	76,131	505	66,238	[6]10,398	4,410
Iran	385,748	-----	246,286	+2,338	137,124	-----	85,483	[4]53,878	14,134
Iraq	353,833	-----	331,458	+7,177	[5]15,198	[5]13	-----	15,211	-----
Israel	932	9,795	-----	−155	10,882	[5]4,084	[5]380	[4]13,215	[5]700
Jordan	-----	568	-----	+436	[5]132	1,610	-----	1,742	-----
Kuwait	594,278	-----	527,299	+2,036	64,943	10	32,308	[6]32,645	22,719
Lebanon	-----	5,422	-----	-----	5,422	1,408	-----	[4]6,448	1,028
Neutral Zone	49,829	-----	39,241	−1,262	[5]11,850	[5]33	[5]6,100	5,783	[5]2,900
Qatar	63,088	-----	62,424	+412	[5]252	[5]221	-----	[4]367	-----
Saudi Arabia	456,453	-----	372,929	+1,212	82,312	86	57,593	[4][6]24,900	12,720
Turkey	2,624	-----	-----	+222	2,402	9,652	-----	12,054	-----
United Arab Republic, Syria	-----	5,176	-----	+95	5,081	1,297	-----	6,378	-----
Total	1,923,285	111,892	1,579,637	+12,988	442,753	31,304	265,057	209,473	-----
Africa:									
Algeria (incl. French Sahara)	67,613	-----	63,297	+4,316	-----	11,562	-----	11,562	3,518
Angola	477	832	-----	−3	1,312	770	-----	[4]1,626	319
Republic of the Congo	-----	-----	-----	-----	-----	2,602	-----	2,602	-----
Cameroun	-----	-----	-----	-----	-----	934	-----	934	-----
Canary Islands	-----	21,577	-----	+13	28,950	3,098	10,521	21,527	5,182
Ethiopia	-----	-----	-----	-----	-----	935	-----	935	-----
States formerly in Fr. Equatorial Africa	6,003	-----	5,843	+160	-----	1,475	-----	1,475	-----
States formerly in Fr. West Africa	-----	-----	-----	-----	-----	4,072	-----	4,072	7,668
Ghana	-----	-----	-----	-----	-----	3,525	12	3,513	-----
Kenya	-----	-----	-----	-----	-----	6,273	126	[4]6,170	859
Liberia	-----	-----	-----	-----	-----	434	-----	434	[5]40
Libya	-----	-----	-----	-----	-----	1,588	-----	1,588	-----
Malagasy, Republic of	-----	-----	-----	-----	-----	1,043	-----	1,043	-----
Morocco	695	647	-----	−139	1,481	5,099	21	[4]5,987	[5]530
Mozambique	-----	-----	-----	-----	-----	1,097	-----	1,097	-----
Nigeria	6,552	-----	6,226	+326	-----	5,813	-----	5,813	-----
Federation of Rhodesia and Nyasaland	-----	-----	-----	-----	-----	4,306	48	4,258	-----
Sierra Leone	-----	-----	-----	-----	-----	2,268	-----	2,268	1,909
South Africa, Union of	-----	9,579	-----	+370	9,209	20,251	1,290	[4]29,405	2,712
The Sudan	-----	-----	-----	-----	-----	3,373	-----	3,373	-----
Tanganyika	-----	-----	-----	-----	-----	2,603	390	[4]2,175	9
Tunisia	-----	-----	-----	-----	-----	3,522	-----	[4]3,844	-----
Uganda	-----	-----	-----	-----	-----	1,210	178	1,032	26
United Arab Republic, Egypt	23,968	15.382	6,007	+2,418	30,925	7,892	1,245	[4]34,288	178
Total	105,308	48,017	81,373	+7,461	71,877	95,745	13,831	151,021	-----
South Asia, Far East, and Oceania:									
Australia	-----	83,430	-----	−542	86,630	12,196	12,818	[4]80,965	9,422
British Borneo	34,005	-----	18,882	-----	[5]15,123	868	12,366	3,625	[5]1,000
Burma	4,078	-----	-----	+199	3,879	588	71	4,396	-----
Ceylon	-----	-----	-----	-----	-----	4,579	6	4,573	3,206
Hong Kong	-----	-----	-----	-----	-----	8,691	[5]169	8,522	-----

See footnotes at end of table.

TABLE 89.—World supply and demand of crude petroleum and refined products—Continued

(Thousands of barrels)

Country	1960								
	Crude and topped crude					Refined products			
	Production	Imports	Exports and re-exports	Stock change, other demand, and loss	Total[1] refinery input / Total[2] refinery output	Imports	Exports and re exports	Domestic demand (incl. bunkers[3]	Bunkers all flags (as reported)
South Asia, Far East, and Oceania—Continued									
India	3,370	42,324	----------	+608	45,086	[5] 17,017	[5] 1,983	60,120	[5] 3,400
Indonesia	152,988	12,669	80,528	+5,478	[5] 86,703	4,521	45,037	[4] 35,274	6,168
Japan	3,678	195,748	----------	−2,794	207,883	38,323	3,848	242,358	26,771
Korea, South	----------	----------	----------	----------	----------	5,209	----------	[4] 5,113	----------
Malaya and Singapore	----------	2,115	1,732	+383	----------	44,096	18,051	26,045	13,260
Netherlands New Guinea	1,538	----------	1,538	----------	----------	(7)	----------	(7)	----------
New Caledonia	----------	----------	----------	----------	----------	[5] 408	----------	408	----------
New Zealand	5	----------	----------	+5	----------	13,465	72	13,393	[5] 1,557
Pakistan	2,636	----------	----------	+252	2,384	[5] 11,456	----------	[4] 17,605	1,901
Philippines	----------	10,474	----------	+383	10,091	9,496	----------	19,587	167
Taiwan	14	7,949	----------	+276	7,687	128	113	7,702	422
Thailand	----------	----------	----------	----------	----------	8,572	69	8,503	465
Vietnam, South (incl. Cambodia)	----------	----------	----------	----------	----------	6,123	----------	6,123	74
Total	202,312	354,709	102,680	+4,248	465,466	185,736	94,603	544,312	----------
Total excluding Eastern Europe, U.S.S.R., and Mainland China	6,466,493	2,641,422	2,597,285	−14,397	6,782,201	1,235,832	1,337,762	6,735,889	----------
Total Sino-Soviet bloc[5]	1,208,000	7,300	80,000	−6,700	1,142,000	(7)	84,000	1,058,000	----------
Total world[5]	7,674,493	2,648,722	2,677,285	−21,097	7,924,201	1,235,832	1,421,762	7,793,889	----------
	1961								
North America:									
Canada	220,461	133,249	65,223	−5,437	297,818	29,918	3,516	[4] 322,043	[5] 11,315
Mexico	106,784	132	6,683	−535	118,961	7,495	8,657	117,799	----------
United States (incl. Alaska and Hawaii)	2,621,758	381,548	3,227	+12,921	3,156,605	307,887	60,167	[4] 3,566,535	71,825
Total	2,949,003	514,929	75,133	+6,949	3,573,384	345,300	72,340	4,006,377	----------

Central America and Caribbean:									
Costa Rica	----------	----------	----------	----------	----------	[5] 1,099	----------	1,099	----------
Cuba	[5] 80	[5] 10,000	----------	+80	[5] 10,000	[5] 15,980	----------	25,980	----------
Dominican Republic	----------	----------	----------	----------	----------	[5] 2,288	----------	2,288	----------
El Salvador	----------	----------	----------	----------	----------	[5] 1,622	----------	1,622	----------
Guatemala	----------	----------	----------	----------	----------	3,681	----------	3,681	----------
Haiti	----------	----------	----------	----------	----------	[5] 508	----------	508	----------
Honduras	----------	----------	----------	----------	----------	[5] 1,848	----------	1,848	----------
Jamaica	----------	----------	----------	----------	----------	6,468	----------	6,468	[5] 1,200
Nicaragua	----------	----------	----------	----------	----------	1,409	----------	1,409	----------
Panama, Canal Zone	----------	----------	----------	----------	----------	9,959	2,242	7,717	6,856
Panama, Republic of	----------	----------	----------	----------	----------	[5] 2,797	----------	2,797	----------
Puerto Rico	----------	26,478	----------	−365	32,308	9,716	17,049	24,975	----------
Total	80	36,478	----------	−285	42,308	57,375	19,291	80,392	----------
South America:									
Argentina	85,012	12,912	853	+4,217	92,854	13,310	----------	[4] 102,441	1,690
Bolivia	2,989	----------	743	+1	2,245	137	70	[4] 2,317	----------
Brazil	34,815	55,626	7,978	+2,483	79,980	[5] 29,540	----------	109,520	----------
British Guiana	----------	----------	----------	----------	----------	[5] 3,601	----------	3,601	----------
Chile	9,263	3,142	----------	−175	[5] 12,580	[5] 4,022	----------	16,602	----------
Columbia	52,899	----------	27,297	+177	[5] 28,403	[5] 1,466	[5] 2,654	27,215	[5] 1,204
Ecuador	2,926	789	----------	−501	4,216	247	----------	4,463	----------
Netherlands Antilles	----------	270,647	2,308	+865	299,275	35,630	[5] 256,322	[6] 78,583	[5] 22,080
Paraguay	----------	----------	----------	----------	----------	[5] 816	----------	816	----------
Peru	19,371	----------	2,520	+237	16,789	3,943	2,251	[4] 19,718	322
Surinam	----------	----------	----------	----------	----------	[5] 1,152	----------	1,152	----------
Trinidad	45,537	62,847	5,349	−690	104,200	211	83,752	[6] 19,041	15,088
Uruguay	----------	9,340	----------	−457	9,797	1,006	----------	10,803	[5] 1,825
Venezuela	1,065,790	----------	743,711	−16,590	346,839	[5] 362	260,673	[4] 58,345	[5] 16,342
Total	1,318,602	415,303	790,759	−10,433	997,178	95,443	605,722	454,612	----------
Western Europe:									
Austria	16,237	1,965	3,446	+161	15,417	10,345	666	[4] 23,371	----------
Belgium and Luxembourg	----------	57,734	----------	−1,591	59,477	26,727	17,104	69,100	5,486
Denmark	----------	1,654	----------	−133	3,044	42,495	514	[4] 43,350	1,430
Finland	----------	10,196	----------	+725	9,471	11,328	----------	20,799	----------
France	15,578	262,059	----------	+1,769	276,093	17,295	61,673	[4] 224,063	13,267
Germany, West	44,960	216,403	----------	−2,247	263,610	46,973	35,051	[4] 286,471	17,323
Greece	----------	13,499	----------	+105	13,394	5,558	----------	18,952	[5] 2,366
Iceland	----------	----------	----------	----------	----------	[5] 2,777	----------	2,777	----------
Ireland	----------	10,858	----------	−36	10,894	3,810	984	13,720	[5] 728
Italy	13,434	244,800	3,248	+1,705	269,253	16,486	55,485	[4] 193,707	29,843
Netherlands	14,271	141,166	11,931	−2,301	166,606	37,051	85,070	118,587	28,264
Norway	----------	12,160	----------	−340	[5] 12,500	20,257	4,884	27,873	2,440
Portugal	----------	9,730	----------	−731	10,461	4,480	1,553	[4] 13,776	3,182
Spain	----------	34,794	----------	−226	[5] 36,055	2,132	770	[4] 40,920	1,449
Sweden	----------	19,030	----------	+142	18,888	78,966	857	96,997	3,881
Switzerland	----------	----------	----------	----------	----------	31,255	45	31,210	----------
United Kingdom	810	349,466	----------	−4,689	354,965	102,168	58,951	[4] 378,702	35,725
Yugoslavia	9,479	[5] 1,552	[5] 1,130	−152	10,053	[5] 634	[5] 886	9,801	----------
Total	114,769	1,387,066	19,755	−7,839	1,530,181	460,737	324,493	1,614,176	----------

See footnotes at end of table.

TABLE 89.—World supply and demand of crude petroleum and refined products—Continued

(Thousands of barrels)

Country	1961								
	Crude and topped crude					Refined products			
	Production	Imports	Exports and re-exports	Stock change, other demand, and loss	Total refinery input[1] / Total refinery output[2]	Imports	Exports and re-exports	Domestic demand (incl. bunkers)[3]	Bunkers all flags (as reported)
Middle East:									
Aden	-----	39,373	-----	+341	39,032	11,023	22,830	[6] 27,225	26,073
Bahrain	16,444	63,406	-----	−39	79,889	562	69,522	[6] 11,207	3,895
Iran	431,653	-----	306,442	+1,702	123,509	-----	69,366	[4] 49,536	14,453
Iraq	365,483	-----	346,954	+2,527	[5] 16,002	[5] 12	-----	16,014	-----
Israel	1,000	[5] 10,760	-----	-----	[5] 11,760	4,257	[5] 303	[4] 14,888	[5] 736
Jordan	-----	[5] 1,355	-----	+201	[5] 1,154	[5] 575	-----	1,729	-----
Kuwait	600,226	-----	538,296	−503	62,433	12	31,187	[6] 31,258	20,981
Lebanon	-----	5,415	-----	-----	5,415	[5] 1,432	[5] 259	6,588	[5] 1,028
Neutral Zone	64,405	-----	52,239	−1,634	[5] 16,300	-----	[5] 7,430	[6] 8,870	[5] 4,100
Qatar	64,386	-----	[5] 64,134	-----	[5] 252	[5] 221	-----	473	-----
Saudi Arabia	508,269	-----	416,822	+635	90,812	48	63,320	[4] [6] 22,724	[5] 12,700
Turkey	3,075	895	-----	+1,035	2,935	8,855	-----	11,790	-----
United Arab Republic, Syria	-----	5,724	-----	+5	5,719	1,040	249	6,510	-----
Total	2,054,941	126,928	1,724,887	+4,270	455,212	28,037	264,466	208,812	-----
Africa:									
Algeria (incl. Sahara)	123,122	-----	117,092	+5,299	[5] 731	9,401	-----	10,132	2,941
Angola	757	857	33	+54	1,527	519	485	1,561	-----
Republic of the Congo	-----	-----	-----	-----	-----	[5] 2,600	-----	2,600	-----
Cameroun	-----	-----	-----	-----	-----	1,051	-----	1,051	-----
Canary Islands	-----	21,954	-----	+43	[5] 30,305	[5] 1,724	[5] 17,314	14,715	[5] 4,831
Ethiopia	-----	-----	-----	-----	-----	935	-----	935	-----
States formerly in French Equatorial Africa	6,186	-----	5,826	+360	-----	1,462	-----	1,462	-----
States formerly in French West Africa	-----	-----	-----	-----	-----	11,080	-----	11,080	6,669
Ghana	-----	-----	-----	-----	-----	[5] 3,532	-----	3,532	-----
Kenya	-----	-----	-----	-----	-----	[5] 5,954	[5] 193	[4] 6,160	[5] 1,120
Liberia	-----	-----	-----	-----	-----	[5] 434	-----	434	[5] 40
Libya	6,642	-----	5,246	+1,396	-----	[5] 1,175	-----	1,175	-----
Malagasy, Republic of	-----	-----	-----	-----	-----	1,005	-----	1,005	-----
Morocco	596	[5] 1,311	-----	-----	1,907	4,795	-----	[4] 6,381	[5] 528

Mozambique	-	[5] 2,920	-	-	[5] 2,920	[5] 51	[5] 1,728	1,243	-
Nigeria	16,802	-	16,345	+457	-	7,016	-	7,016	-
Federation of Rhodesia and Nyasaland	-	-	-	-	-	[5] 4,376	-	4,376	-
Sierra Leone	-	-	-	-	-	[5] 2,951	-	2,951	[5] 1,908
South Africa, Republic of	-	11,093	-	+702	10,395	20,914	426	30,883	[5] 3,233
The Sudan	-	-	-	-	-	[5] 3,312	-	3,312	[5] 1,908
Tanganyika	-	-	-	-	-	2,405	366	[4] 2,139	-
Tunisia	-	-	-	-	-	4,203	-	[4] 4,141	164
Uganda	-	-	-	-	-	1,179	[5] 227	952	-
United Arab Republic, Egypt	26,032	[5] 16,458	8,482	-	[5] 34,008	[5] 7,909	[5] 1,245	40,672	[5] 1,240
Total	180,137	54,593	153,024	+8,311	81,793	99,983	21,984	159,908	-
South Asia, Far East, and Oceania:									
Australia	-	91,908	-	−169	94,058	11,654	13,869	[4] 84,095	9,616
British Borneo	30,551	-	14,302	-	[5] 16,249	[5] 868	[5] 12,366	4,751	[5] 1,000
Burma	4,194	90	-	-	[5] 4,284	514	101	4,697	-
Ceylon	-	-	-	-	-	4,478	47	4,431	2,754
Hong Kong	-	-	-	-	-	9,763	169	9,594	[5] 2,550
India	3,356	[5] 44,700	-	+537	[5] 47,519	14,283	1,448	60,354	[5] 3,480
Indonesia	156,845	[5] 6,602	89,142	+360	[5] 81,590	[5] 4,250	[5] 38,326	[4] 34,862	[5] 6,168
Japan	4,590	236,799	-	−1,515	242,904	62,243	5,416	299,731	[5] 26,800
Korea, South	-	-	-	-	-	5,254	-	[4] 5,675	-
Malaya and Singapore	-	[5] 6,288	[5] 4,037	−1,138	13,337	[5] 52,274	[5] 22,013	43,598	[5] 16,678
Netherlands New Guinea	1,082	-	[5] 1,082	-	-	(7)	-	(7)	-
New Caledonia	-	-	-	-	-	567	-	567	-
New Zealand	-	-	-	-	-	[5] 14,296	-	14,296	-
Pakistan	2,819	-	-	+36	2,783	[5] 15,889	-	18,672	2,040
Philippines	-	16,725	-	−1,759	18,484	3,700	-	22,184	232
Taiwan	17	[5] 8,211	-	-	8,228	[5] 139	[5] 708	7,659	[5] 385
Thailand	-	-	-	-	-	9,562	-	9,562	639
Viet-Nam, South (includes Cambodia)	-	-	-	-	-	6,747	-	6,747	73
Total	203,454	411,323	108,563	−3,648	529,436	216,481	94,463	631,475	-
Total excluding Eastern Europe, U.S.S.R., and Mainland China	6,820,986	2,946,620	2,872,121	−2,675	7,209,492	1,303,356	1,402,759	7,155,752	-
Total Sino-Soviet bloc [5]	1,367,000	5,500	102,000	−21,500	1,292,000	(7)	102,000	1,190,000	-
Total world	8,187,986	2,952,120	2,974,121	−24,175	8,501,492	1,303,356	1,504,759	8,345,752	-

---

[1] Total input includes crude runs to stills plus runs of other unfinished oils, topped crude and natural-gas liquids blended.

[2] Total output includes refined product output plus refinery fuel and loss; excludes liquefied-petroleum gases sold directly for fuel and chemical uses from natural-gasoline plants.

[3] Unless otherwise specified, data represent apparent domestic demand (including inland demand, refinery fuel and loss, and bunkers). Apparent domestic demand is derived from the components of refined-product output, plus imports, minus exports, with no allowance for changes in stocks.

[4] Domestic demand as reported, including refinery fuel and loss, stock changes, and bunkers; also includes, where available, liquefied petroleum gases sold directly for fuel and chemical uses from natural-gasoline plants.

[5] Estimate based on latest available data.

[6] Apparent domestic demand is heavily influenced by refinery fuel and loss, bunker loadings, and inventory changes.

[7] Insignificant.

[8] Preliminary.

NATIVE ASPHALT

Bituminous Limestone and Sandstone.—Production of bituminous limestone totaled 1,134,300 short tons in 1961 compared with 1960 production of 1,235,700 short tons. The average value per ton increased 10 cents to $2.54 in 1961 compared with $2.44 in 1960. Bituminous limestone was produced in Alabama and Texas. Bituminous sandstone was produced only in Missouri in 1961 and totaled 2,100 short tons; value averaged $11.76 per short ton.

Gilsonite.—Production of gilsonite in 1961, all of which was mined in Utah, totaled 422,300 short tons, an increase of 39,300 tons for the year.

TABLE 90.—Production and value of bituminous limestone, bituminous sandstone, and gilsonite, in the United States

Year	Bituminous limestone		Bituminous sandstone		Gilsonite	
	Production (short tons)	Value (thousands)	Production (short tons)	Value (thousands)	Production (short tons)	Value (thousands)
1951	1, 378, 434	$4, 159	(1)	(1)	65, 521	$1, 895
1952	1, 428. 562	3, 560	142, 136	$1, 127	60, 740	1, 780
1953	1, 327, 224	3, 408	113, 320	942	60, 505	2, 184
1954	1, 191, 793	2, 782	146. 029	905	75, 943	2, 724
1955	1, 330. 311	3. 274	96. 896	837	82. 822	3, 117
1956	1, 358. 669	3. 223	99. 864	891	89, 003	3, 822
1957	1, 134. 781	2, 996	33. 726	225	207. 704	4, 259
1958	1, 305, 555	3, 218	20. 938	125	317, 280	4, 864
1959	1, 509, 277	3, 810	9, 488	58	379, 362	9, 385
1960	1, 235. 658	3, 009	7, 216	61	383, 037	10, 020
1961	1, 134, 340	2. 884	2, 158	18	422, 294	9, 916

[1] Included with bituminous limestone.

Helium

By Harold W. Lipper[1]

◆

CONTENTS

Summary 487
Production 487
Shipments 488
Consumption and uses 489
Resources 489
Conservation 490
Prices 491
Foreign trade 492
Technology 492

SUMMARY

Helium production and shipment reached new peaks in 1961. The Bureau of Mines produced 727 million cubic feet, 13 percent more than the 1960 record, and shipped 552 million cubic feet, 16 percent more than the 1960 record. Production exceeded demand for the third successive year, enabling the Bureau of Mines to add 174 million cubic feet to the volume stored underground for future use. At the end of 1961, the total volume of helium in underground storage in the Cliffside gasfield was 447 million cubic feet.

Contracts to implement a long-range helium conservation program were completed with four companies, obligating all the contracting authority of $47.5 million a year made available by the Congress. The four companies will finance, build, and operate helium extraction plants to recover from natural gas an annual average of 3.1 billion cubic feet of helium that would ordinarily be wasted when the helium-bearing natural gas is used for fuel.

A Helium Research Center was established at Amarillo, Tex., as an integral part of the helium conservation program. Research will include studies of the properties and uses of helium so that the conserved helium may be used wisely and effectively. Seven articles were published describing work at the center.

PRODUCTION

Helium production by the Bureau of Mines in 1961 was 727,102,807 cubic feet, an increase of 13 percent over the previous record set in 1960. For the first time since the 1930's, helium was produced and sold by a private plant. Operations began in November 1961 at a plant built by Kerr-McGee Oil Industries, Inc., to extract helium from company-developed resources in the Pinta Dome field, Apache County, Ariz. Annual production capacity is reported to be 65 million cubic feet. Helium produced at this plant is sold by the company to commercial helium users, principally on the west coast.

---

[1] Technical assistant, Office of Assistant Director, Helium.

Bureau of Mines helium plants at Amarillo and Exell, Tex., Keyes, Okla., Otis, Kans., and Shiprock (Navajo), N. Mex., were operated all year. The Navajo and Otis plants were operated at about half capacity because of limited supplies of helium-bearing natural gas. The remaining plants operated at near maximum capacities as normal seasonal variations in helium-bearing natural gas supplies permitted.

Total production exceeded demand. The excess, 174 million cubic feet, was stored underground in the Cliffside field, increasing the total volume in underground storage to 447 million cubic feet. Helium stored underground requires processing and purification before shipment but affords a significant increase in helium supply on short notice.

TABLE 1.—Helium production in the United States, 1921–61

(Thousand cubic feet)

Year	Production
1921-28	[1] 5,761
1929-42	[1] 11,776
1943-49	[1] 83,545
1950-54	[1] 137,957
1955	220,711
1956	243,880
1957	291,457
1958	334,175
1959	476,892
1960	642,033
1961	[2] 727,103
Cumulative production, 1921-61	4,421,812

[1] Annual average.
[2] Does not include helium produced at the private Kerr-McGee plant.

SHIPMENTS

Helium shipments by the Bureau of Mines totaled 551,784,315 cubic feet. Shipments to Federal agencies were 415,214,183 cubic feet, and those to non-Federal (commercial) consumers were 136,570,132 cubic feet.

The five Bureau plants handled shipment of 1,804 tank cars, 594 semitrailers, and 211,444 standard cylinders.

An order of 33 new tank cars increased the pool of cars to 221. Ownership of cars is divided between the Bureau of Mines (196) and the Atomic Energy Commission (25). To provide efficient utilization, tank cars are used in a common pool for shipment of helium produced by the Bureau.

Bureau plants, except Amarillo, ship helium in tank cars. At the Amarillo plant small cylinders are filled, shipped, and maintained. Most of the trailer shipments originate there. Except for the Otis plant, the Bureau plants that ship tank cars are equipped to accommodate filling pressures up to 4,000 p.s.i.g. The Otis plant is limited to a filling pressure of 2,600 p.s.i.g.

CONSUMPTION AND USES

About 75 percent of the Bureau of Mines helium shipments in 1960 went directly to Federal agencies. A large part of the remaining 25 percent was used by defense contractors. Consumption in 1961 increased about 16 percent over the record consumption of 475 million cubic feet in 1960.

Helium is useful for many purposes because of its unique properties. These include inertness; high thermal and electrical conductivity; low density, low solubility and low refractive index; slow ionization; rapid diffusion; transparency to radioactive particles; and low liquefaction temperature.

Several nuclear power reactors have been designed, but not built, that would utilize helium's properties of inertness, high heat conductivity, and transparency to radioactive particles for extracting heat from the reactor to produce power.

In rockets and missiles using liquid fuels, helium is used as a purging and pressurizing agent because of its inertness, low solubility, low liquefying temperature, lightweight, and the ease with which large quantities will flow through small piping.

Some metals become superconductors at the temperature of liquid helium (452° below zero F.). At this temperature, they show little or no resistance to the flow of electricity. Because of this, small magnets immersed in liquid helium produce high-energy magnetic fields for nuclear and space research at a fraction of the power, weight, and space requirements of conventional magnets.

Helium is also used in shielded-arc welding, leak detection, artificial breathing mixtures, and balloons.

RESOURCES

The total helium resources of the United States in helium-bearing natural gas containing at least three-tenths percent helium by volume are estimated to be 196 billion cubic feet as of January 1, 1961. Approximately 94 percent of these resources are contained in five helium-bearing gasfields: (1) The Hugoton field of Kansas, Oklahoma, and Texas; (2) the Panhandle field of Texas; (3) the Keyes field of Oklahoma; (4) the Greenwood field of Kansas and Colorado; and (5) the Cliffside field of Texas.

Resources available to the five Bureau of Mines helium plants represent about 10 percent of these known resources. The two largest plants of the Bureau of Mines (Exell, Tex., and Keyes, Okla.) extract helium from gas produced within the area where the major helium resources are found. Plants at Shiprock, N. Mex., and Otis, Kans., extract helium from gas produced in small, isolated fields outside the area. The only developed source of helium-bearing natural gas owned by the Government is the Cliffside field in the Texas Panhandle not far from Amarillo. Helium from this source is extracted at the Bureau of Mines Amarillo plant.

Discoveries of helium-bearing gas deposits in eastern Utah and western Colorado offer prospects of additional helium resources. Development of the area by private companies for oil and fuel-gas production has revealed gas deposits containing helium. However, extent of the new gasfields has not been defined fully, and fuel-gas production is small.

Two minor helium-bearing natural gasfields discovered on lands of the public domain have been withdrawn and established as Helium Reserve No. 1, Woodside structure, Utah, and Helium Reserve No. 2, Harley Dome, Utah, in March 1924 and June 1933, respectively. Each of the two reserves is estimated to contain less than 100 million cubic feet of helium. In addition to being quite small by present-day standards of helium use, the helium-bearing gas discovered in the reserves has no value as fuel, and the fields have been held in standby status; neither has been produced.

Helium-bearing natural gases offer the only presently known economical sources of helium production, but other occurrences are of interest. They include gases from mineral springs, fumaroles, and volcanoes; the air; rocks; minerals; certain sands; and meteorites. Helium can also be formed by nuclear bombardment and fusion.

CONSERVATION

The Nation's helium resources appear to be adequate to meet predicted demands only if the large volume now wasted can be saved for future use. The resources are diminishing rapidly as helium-bearing natural gas is used for fuel. Unless helium is recovered before the natural gas is used as fuel, the helium is lost to the atmosphere without serving any useful purpose.

However, important progress was made during 1961 to assure a continuing helium supply. New legislation (Public Law 86–777), amending the Helium Act of 1925, as amended (43 Stat. 1110; 50 U.S.C. 161, 163–166), became effective March 1, 1961, and includes for the first time authority to enter into long-term contracts for the purchase of helium. Contracting authority not to exceed $47.5 million in any one fiscal year became available for the helium conservation program in the act (Public Law 87–122) making appropriations for the Department of the Interior and related agencies for the fiscal year ending June 30, 1962. Between August 15 and November 13, 1961, the Bureau of Mines negotiated and, with the approval of the Secretary of the Interior, executed four contracts with private companies that obligate fully all of the available $47.5 million contracting authority.

Under these contracts, five plants will be financed, constructed, and operated by four private companies to extract helium from natural gas en route to fuel markets, and the helium will be sold to the Bureau. Each of the four contracts extends for a period of 22 years, including the time required for construction. Additional information regarding the contracts is shown in the following table:

Company (parent companies in parentheses)	Plant location and date of contract	Initial unit price (for 1,000 cubic feet)	Maximum annual obligation (million dollars)	Estimated helium volume (million cubic feet)	
				Annual average	Life of contract
Helex Co. (Northern Natural Gas Co.).	Bushton, Kans., Aug. 15, 1961.	$11.24	$9.5	675	13,500
Cities Service Helex, Inc. (Cities Service Co.).	Ulysses, Kans., Aug. 22, 1961.	11.78	9.1	610	12,200
National Helium Corp. (Panhandle Eastern Pipe Line Co. and National Distillers & Chemical Corp.).	Liberal, Kans., Sept. 13, 1961.	11.78	15.2	1,053	21,060
Phillips Petroleum Co.	Dumas, Tex., and Sherman County, Tex. (two plants), Nov. 13, 1961.	10.30	13.7	788	15,766
Weighted average		11.29			
Total			47.5	3,126	62,526

Helium acquired from the private plants will be gathered and transported in a Bureau of Mines pipeline system to the Government-owned Cliffside gasfield near Amarillo, Tex., for storage until needed to meet future requirements. The Bureau of Mines contracted in September 1961 for the design, specifications, mapping, right-of-way acquisition, supervision of construction, and testing of the 450-mile-long pipeline system. A target date of July 1, 1962, has been set for completing the pipeline system to Bushton, Kans., the date when the Helex Co. is expected to begin operations.

PRICES

The revised Helium Act (Public Law 86–777) directs agencies of the Federal Government to purchase all major helium requirements from the Secretary of the Interior and provides that helium shall be sold at prices adequate to cover all costs of carrying out provisions of the act, including repayment to the Treasury of the United States, with interest, all capital assets and funds that may be borrowed to sustain the program.

Until November 18, 1961, sales were at prices established in 1954, $15.50 and $19.00 a thousand cubic feet (f.o.b. plant) for Federal and non-Federal purchasers, respectively. An increased price to cover all costs of carrying out the provisions of the Helium Act and make the prescribed repayments was calculated to be $35.00 a thousand cubic feet. On November 18, 1961, the new price went into effect and is applicable to all users.

Changes were also made in the rates charged by the Bureau of Mines for rental of railway tank cars, highway trailers, and cylinders used in transporting helium and in the rates charged for services incident to helium sales and distribution. Although the regulations governing the sale of helium and rental of containers are applicable only to the Bureau's non-Federal customers, all users of services are charged at the same rates in order that costs of the program shall be shared proportionately. Revised regulations, a schedule of charges, and other information on the sale of helium and rental of containers by the Bureau of Mines are included in the Code of Federal Regulations (30 C.F.R. 1).

FOREIGN TRADE

Small quantities of helium are exported annually under licenses approved by the Secretary of State. An important use for helium abroad is in fundamental research at temperatures near absolute zero.

TECHNOLOGY

A Helium Research Center was established by the Bureau of Mines at Amarillo, Tex., in May 1961 as an integral part of the helium conservation program. In addition to conducting research directed toward developing and improving techniques for extracting, purifying, and saving helium, the center will also seek to learn more about the properties and uses of helium in order that the conserved helium may be used wisely and effectively in furthering the national scientific progress and economy.

Published results of research completed at the Helium Research Center included phase equilibria of helium-bearing natural gases,[2] compressibility data on helium and helium-nitrogen mixtures,[3] chromatographic analysis of helium in natural gases,[4] and the determination of trace impurities in grade A helium.[5] An Information Circular described helium production at the Bureau of Mines Keyes Helium plant.[6]

A continuous survey is conducted to determine potential new sources of helium-bearing natural gas in various places throughout the United States and, to a limited extent, in other countries. Results of analysis are furnished to the gas-well or pipeline owner in return for supplying the sample. In 1961, 452 samples were analyzed without discovering new deposits of helium-bearing natural gas comparable with known deposits.

---

[2] Stroud, L., Miller, J. E., and Brandt, L. W. Low-Temperature Phase Equilibria in Helium-Bearing Gases: Cliffside Gas: Bureau of Mines Rept. of Investigations 5823, 1961, 19 pp. Stroud, L., DeVaney, W. E., and Miller, J. E. Multiple Liquid Phases in a Natural-Gas System: Soc. Pet. Eng. Jour., vol. 1, No. 3, September 1961, pp. 137–141. Brandt, L. W., Stroud, L., and Miller, J. E. Phase Equilibria in Natural Gas Systems, Data for Two Helium-Bearing Natural Gases: Jour. Chem. Eng. Data, vol. 6, No. 1, January 1961, pp. 6–13.

[3] Miller, J. E., Brandt, L. W., and Stroud, L. Compressibility Factors for Helium and Helium--Nitrogen Mixtures: Bureau of Mines Rept. of Investigations 5845, 1961, 11 pp.

[4] Klingman, C. L., and Marshall, J. D. Continuous Analysis of Helium in Natural Gas by Chromatography: Bureau of Mines Rept. of Investigations 5873, 1961, 17 pp. Klingman, C. L. Modified Chromatograph to Record Helium Content of Natural Gas Streams: Rev. Sci. Instr., vol. 32, No. 7, July 1961, pp. 822–824.

[5] Kirkland, C. G., Brandt, L. W., and Deaton, W. M. A Method and Apparatus for Concentrating Trace Impurities and Analyzing Grade-A Helium: Advances in Cryogenic Eng., Proc. 1960 Cryogenic Eng. Conf., Aug. 23–25, K. D. Timmerhaus, ed. Plenum Press, Inc., New York, N.Y., vol. 6, 1961, pp. 399–405.

[6] Deaton, W. M., and Haynes, R. D. Helium Production at the Bureau of Mines Keyes, Okla., Plant: Bureau of Mines Information Cir. 8018, 1961, 16 pp.

PART III. APPENDIX

Tables of Measurement

Volumetric measures

	U.S. gallons	Imperial gallons	Cubic feet	Barrels	Cubic centimeters	Liters	Cubic meter
1 U.S.gallon [1]	1	0. 83268	0. 13368	0. 02381	3, 785. 4	3. 7853	0. 0037854
1 imperial gallon [2]	1. 201	1	. 16054	. 028594	4, 546. 04	4. 5460	. 004546
1 cubic foot	7. 4805	6. 22888	1	. 17811	28, 317. 01	28. 316	. 028317
1 barrel [3]	42	34. 972	5. 6146	1	158, 987. 55	158. 98	. 15899
1 cubic centimeter	. 00026417	. 00021996	. 000035314	. 0000062895	1	. 00099997	. 000001
1 liter	. 26418	. 219976	. 035316	. 0062899	1, 000. 027	1	. 001000027
1 cubic meter	264. 17	219. 97	35. 314	6. 2898	1, 000, 000	999. 97	1

[1] U.S. gallon=the volume occupied by 231 cubic inches.

[2] 1 imperial gallon=the volume occupied by 10 pounds of water at 62° F. when weighed against brass in air at 30″ barometric pressure.

[3] 1 barrel=42 U.S. gallons.

Weight measures

	Pounds	Kilograms	Short or net tons	Metric tons	Long ton
1 pound	1	0. 45359	0. 0005	0. 00045359	0. 00044643
1 short or net hundredweight	100. 0	45. 359	. 05	. 04536	. 04464
1 gross or long hundredweight	112. 0	50. 802	. 056	. 05080	. 05
1 kilogram	2. 2046	1	. 0011023	. 001	. 0009842
1 short or net ton	2, 000	907. 185	1	. 90718	. 89286
1 metric ton	2, 204. 6	1, 000	1. 1023	1	. 98421
1 long ton	2, 240	1, 016. 06	1. 12	1. 01606	1

NOTE.—1 English water ton=the volume occupied by 1 long ton of water at 60° F.

Index

Page

- Anthracite. *See* Pennsylvania anthracite.
- Asphalt and related bitumens (native):
  - Bituminous limestone 486
  - Bituminous sandstone 486
  - Gilsonite 486
  - Petroleum Asphalt 453
- Bituminous Coal and Lignite:
  - As source of energy 2–5, 147
  - Auger 106–108
    - Mining 106–108
    - Sales 108
  - Cleaning equipment, types 120
  - Cleaning methods 120
    - Mechanical. *See* Bituminous coal and lignite, mechanical cleaning.
    - Pneumatic 120
  - Competitive fuels 4, 5
  - Consumption 8–13, 54, 143–146
    - At coke ovens 144, 145
    - At mines 130–138, 140
    - By consumer class 145
    - By electric power utilities 145
      - Fuel economy 146
  - Deliveries, retail 145
  - Disposition 70, 71
  - Distribution 34–37
  - Drying, thermal 128, 129
  - Employment 48, 53, 75, 130–138
  - Foreign trade 151–154
    - Exports 151–154
    - Imports 151
  - Fuel briquets 265–281
  - Fuel efficiency 54, 55, 146
  - Mechanical cleaning 54, 117–122
    - By method of mining 121, 122
    - Growth 120
  - Mechanical crushing 123, 124
  - Mechanical loading 54, 109–116
  - Mechanization 54, 117
  - Packaged fuel 265–281
  - Preparation, thermal drying 128, 129
  - Prices 20, 55, 70, 71, 130–138, 148, 149
  - Price indicators 23, 55
  - Production 2–7, 53, 55, 59–77, 130–138, 154–156
    - Auger mines 76, 106–108
      - By thickness of seams 58, 59
      - Per man-day 106–108
      - Value per ton 148
    - By days 65
    - By districts 67, 71
    - By months 64, 66, 67
    - By States, cumulative 69
    - By States and counties 130–138
    - By weeks 64, 65, 68
    - By years 61, 62, 69
    - Growth 61, 62, 92, 93
    - Mined by continuous mining machines 79, 113
    - Percentage crushed 123, 124
    - Strip mines 55, 62, 91–94, 96–105
      - By thickness of seams 58, 59
      - Per man-day 76, 91
      - Percentage 92, 93
      - Value per ton 92, 93, 95, 148
    - Underground mines 76, 77, 81, 84
      - By thickness of seams 58, 59
      - Cut by hand 79
      - Cut by machines 79
      - Hand-loaded 55, 109–115
      - Machine-cut 79
      - Machine-loaded 55, 109–115

Page

- Bituminous Coal and Lignite—Continued
  - Production—Continued
    - Underground Mines—Continued
      - Mine cars 83–89
        - Rail 83, 85–87
        - Rubber-tired 83, 88, 89
      - Per man-day 74, 78
      - Shot from solid 79
      - Track 83
      - Value per ton 95, 148
    - Value 55, 61, 63, 70, 71, 130–138, 148, 149
    - Where shot holes are power-drilled 81
    - World 154–156
  - Reserves 56, 57
  - Shipments 139–143
    - Railroads 139–143
    - Trucks 139–143
    - Waterways 139–143
  - Stocks 54, 55, 63, 147
  - Strip mining 91–105
    - By States and counties 101–105
  - Technology 157, 158
  - Thermal drying 128, 129
  - Treated to allay dust, percent 125–127
    - Production 125–127
  - Underground mining 77–90
  - Value per ton 148, 149
- Bituminous coal and lignite dust, allaying, treatment 125–127
- Bituminous coal and lignite industry:
  - Annual review 53
  - Employment, trend 53, 62
  - Salient statistics 55
- Bituminous coal and lignite mines:
  - Animal haulage 82
  - Auger 106–108
  - Belt-conveyor haulage 82, 84, 90
  - Capacity 54, 61, 63
  - Cleaning plants, number 118, 119
    - Percentage of production 55, 118, 119
  - Coal crushing 123, 124
  - Coal-cutting machines, number 79
  - Conveyors, sales 116, 117
  - Days active 130–138
  - Disaster 47, 48
  - Employment 48, 49, 53, 61, 62
    - Daily 130–138
  - Fatalities 47, 48
  - Haulage units, number 82–90
    - Types 82–89
  - Injuries 47, 48
  - Loading units, mechanical, number 110, 111, 114
    - Mobile, sales 116
  - Locomotives, battery 74, 75
    - Other types 74, 75
    - Trolley 74, 75
  - Man-days worked 130–138
  - Men employed 130–138
  - Mine-days active 130–138
  - Miners, injuries, frequency rate 47, 48
    - Man-days worked 47, 48, 130–138
    - Man-hours worked 47, 48
    - Number employed 48, 130–138
    - Number working daily 55, 70, 71, 130–138
    - Output per man-day 55, 62, 75, 101–108, 130–138
    - Output per man-year 62
    - Production per man-day 55, 62, 70, 71, 76, 101–108, 130–138
    - Strip, man-days worked 101–105

Page

Bituminous coal and lignite mines—Continued
  Mining machines, continuous, sales 116
    Number 55, 58, 59, 70, 71, 72–74
  Power drills, for shot holes, use 80, 81
    Number 80, 81
  Rope haulage 82
  Scrapers, sales 116
  Shuttle cars, sales 117
  Strip 91–105
    Bulldozers, number 94, 96
    Carryalls, number 94, 96
    Daily employment 100–105
    Draglines, number 94, 96
    Equipment 94, 96
    Growth 92, 93
    Haulage 99, 100
    Number 58, 59, 92, 93, 96–98, 101–105
    Power drills 97, 98
  Underground 77, 90
    Haulage units 82, 83
    Mechanical loading 109–117
      Equipment, sales 116, 117
    Production, per man-day 59, 74, 78, 91
    Using mechanical loading devices, number 114
Bituminous coal and lignite seams thickness 58–60
  Percentage of coal produced 58
Bituminous Coal Research, Inc 157
Carbon black:
  Consumption and uses 303
  Foreign Trade 307
    Exports 308
    Imports 307
  General summary 301
  Prices (carlots) 307
  Producers 307
  Production 304
    Method and yield 304
    Number and capacity of plants 306
  Sales 306
  Salient statistics 302
  Scope of report 301
  Shipments 305
  Stocks 306
  Value 307
  World Production 311
Carbon dioxide, natural 6
Coke and coal chemicals:
  Ammonia:
    NH_3 equivalent of all forms 250
    Sulfate equivalent of all forms 208, 250, 259
      Yield per ton of coal 208, 259
  Ammonia liquor (NH_3 content):
    Production 250, 259
    Sales 250, 259
      Value 250, 259
    Stocks 250, 259
  Ammonium phosphate (di- and mono-):
    Production 250
    Sales 250
      Value 250
    Stocks 250
  Ammonium sulfate:
    Production 250, 259
    Sales 250, 259
      Value 250, 259
    Stocks 250, 259
  Benzene (benzol):
    Consumption 263
    Production 250, 261, 262
      By grades 262
      By States 261
    Sales 250, 261, 262
      Value 250, 261, 262
    Supply 263
    Stocks 250
    Yield from crude light oil refined 260, 261
  Breeze (coke screenings):
    Consumption 207, 215, 216
    Production 207, 215, 252
      Value 207, 215
    Sales 208, 215, 216
      Value 208, 215
    Stocks 215, 235
    Yield per ton of coal 207, 215
  Chemical oil (tar acid oil):
    Production 250
    Sales 250
      Value 250
    Stocks 250

Page

Coke and coal chemicals—Continued
  Coal:
    Anthracite:
      Carbonized 207, 221, 223
        By months 221
        By States 223
      Stocks 236
      Value 207
    Bituminous:
      Carbonized 207, 221, 222, 223, 224
        By months 221
        By States 222
        From captive mines 227
      Preparation:
        Blending 224
        Washed and unwashed 223, 224
      Source:
        By States of origin 225
        By volatile content 224, 225
        Destination (consuming States) 226
      Stocks, by months 236
      Value 207, 222
        Average per ton at merchant plants 55
  Coke industry:
    Annual review 203
    Days active 49
    Employment 49
    Injuries 49
    Salient statistics 206
    Scope of report 209
    Statistical summary 207
    Technology 240
    World review 245
  Coke, oven and beehive:
    Consumption 12, 206, 207, 228, 230, 231, 232
      In iron blast furnaces 228
      In principal anthracite markets 194
      Per ton of pig iron 229
    Distribution, by consuming States and uses 233
    Foreign trade:
      Exports 206, 228, 239
      Imports 206, 228, 238
    Prices 23, 237
    Production 41, 206, 207, 208, 209, 228, 230, 232
      By days 210, 211
      By merchant and furnace plants 212
      By months 211, 212
      By States 208, 209, 214, 230, 232
      World 206, 246, 247
    Sales 207, 208, 209, 230, 231, 232
      Value 207, 208, 209, 230, 231, 232
    Stocks 13, 206, 235
      At merchant and furnace plants 235
      By kinds 235
      By months 235
      By States 235
    Transportation:
      Rail 33
      Water 34
    Yield per ton of coal 207, 208, 209, 229
  Gas:
    Production 208, 250, 253
      Used in heating ovens 253
    Disposal of surplus 250, 252, 253, 254
      Distributed through city mains 250, 254
      For industrial purposes 250, 254
      For steel or allied plants 250, 254
      Under boilers 250, 254
      Value 250, 253, 254
    Wasted 253
    Yield per ton of coal 208, 253
  Intermediate light oil:
    Production 250
    Sales 250
      Value 250
    Stocks 250
  Light oil (crude):
    Production 208, 250, 252, 260
    Refined on premises 260
    Sales 250
      Value 250
    Stocks 250, 260
    Yield per ton of coal 208, 260
  Ovens:
    Beehive 206, 208, 220
      Abandoned, by States 220
      Average number active, by months 220
      New or rebuilt by States 220
      Number by States 220

Page
Coke and coal chemicals—Continued
  Ovens—Continued
    Slot-type 206, 208, 217, 219
      Abandoned, by States 217
      Age 218
      New ovens, by States 217
      Number, by States 217
      Under construction, by States 217
  Pitch-of-tar:
    Production 250
    Sales 250
      Value 250
    Stocks 250
  Sodium phenolate (carbolate):
    Production 250
    Sales 250
      Value 250
    Stocks 250
  Solvent naphtha:
    Production 250, 261
      By States 261
    Sales 250, 261
      Value 250, 261
    Stocks 250
    Yield from crude light oil refined 250, 261
  Tar (crude):
    Consumption 256
      Burned as fuel 256
      For other purposes 256
      Refined or topped by producers 256
    Production 208, 250, 256
      By States 256
    Sales 250, 256
      Value 250, 256
    Stocks 250, 256
    Yield per ton of coal 208, 256
  Toluene (toluol):
    Production 250, 260, 262
      By grades 262
      By States 260
    Sales 250, 261
      Value 250, 261
    Stocks 250
    Yield from crude light oil refined 260, 261
  Xylene (xylol):
    Production 250, 261
      By States 261
    Sales 250, 261
      Value 250, 261
    Stocks 250
    Yield from crude light oil refined 260, 261
Crude petroleum and petroleum products:
  Asphalt 453–460, 496
    Natural asphalt and bitumens 486
    Salient statistics 452
    Shipments 456–460
  Aviation gasoline 415, 418–419
  Coke 461, 464
  Crude oil 366
    Consumption and distribution 386
    Daily average total demand 394–395
    Production 368
      By leading fields 371–372
      By States 368–382
      World 476–478
    Receipts at refineries 389–393
    Reserves 365
    Runs to stills 386–388
    Salient statistics 358
    Stocks 398–402
    Supply and demand 366–367
    Values and price 403–404
    Wells 383
      Drilled 383–385
      Producing 386
  Demand by products 358–362
  Distillate fuel oil 359, 436–440
    Prices 440
    Salient statistics 437
    Shipments 438–439
  Employment and injuries 14–19, 50
  Energy from 3–10
  Foreign trade 467
    Exports 467, 471–475
    Imports 467–470
    World trade price indexes 41
  Gasoline 359, 415–426
    Consumption and distribution 424–425
    Percentage yields 409, 416
    Pipeline shipments 427–429

Page
Crude petroleum and petroleum products—Continued
  Gasoline—Continued
    Prices 433
    Production 415, 420–426
    Salient statistics 418–421
    Stocks 416, 420–421, 426, 430–432
    Supply (days) 432
  General summary 357
  Import control program 38
  Income 29
  Intercoastal shipments 465–466
  Investments and expenditures 30
  Jet fuel (military grade) 449
    Salient statistics 450
  Kerosine 433–436
    Percentage yields 409, 434
    Prices 436
    Salient statistics 434
    Shipments 435
  Liquified gases 451
  Lubricants 446–448
    Prices 448
    Salient statistics 447
  Miscellaneous oils 461
  Percentage yields 409
  Petroleum coke 461
  Petroleum refineries 415
    Capacity 415
    Number of refineries 415
  Pipeline shipments 389, 392, 428–429
    Crude oil 389, 392–393
    Petroleum products 427–429
  Price index (wholesale) 23
  Refind products, general review 405–406
  Refinery districts 363–365
  Refinery in-put and out-put 408, 411–414
  Refinery capacity 415
  Salient statistics 406–407
  Refined products, stocks 410
  Residual fuel oil 359, 441–445
    Prices 445
    Salient statistics 442
    Shipments 443–444
  Road oil 453
    Salient statistics 455
    Shipments 459
  Scope of report 362–363
  Shipments to U.S. territories and possessions 362
  Still gas 461, 465
  Unfinished oils 461
  Wax 461–464
    Refinery prices 464
    Salient statistics 462, 463
  World oil supply 365
  World supply and demand 479–485
Fuel briquets and packaged fuel:
  Fuel briquets:
    Annual review 265
    Binders 271
    Capacity 268
    Consumption 194, 266
    Foreign trade
      Exports 266, 274
      Imports 266, 275
    Production 266, 268, 269
      By months 269
      By regions 269
      Value 266, 269
      World 266, 281
    Raw fuels 270, 271
    Sales 271
      Value 271
    Salient statistics 266
    Scope of report 267
    Shipments:
      Destination 272
      Methods of transportation 272
    Technology 275
    World review 280
  Packaged fuel:
    Annual review: 265
    Binders 279
    Capacity 277
    Production 266, 277, 278
      By months 278
      By States 278
      Value 266
      World 281

Page
Fuel briquets and packaged fuel—Continued
  Packaged fuel—Continued
    Raw fuels 279
    Sales 279
      Value 279
    Salient statistics 266
    Scope of report 267
    Shipments 279
    World review 280
Helium 487
  Conservation 490
  Consumption and uses 489
  Foreign trade 492
  Prices 491
  Production 487
  Resources 489
  Shipments 488
  Technology 492
Lignite. See also Bituminous coal.
Natural gas:
  Consumption 313, 327–329
    By States 319–325
    By use 328, 329
  Employment and injuries 50
  Exports 326
  General summary 313
  Gross withdrawals 314
  Imports 321–322, 326
  Interstate shipments 319–322, 326
  Marketed production 317, 319, 320
  Pipelines 326, 327
  Processed at natural-gasoline plants 330
  Regional production and consumption 320
  Reserves 315
  Salient statistics 313
  Scope of report 314
  Underground storage 314, 317, 318
  Value at point of consumption 323–327
  Value at wells 317
  Wells 318
  World production 331, 332
Natural gas liquids:
  Butane 335, 340, 342, 344, 350, 351
  Butane-propane mixture 335, 340, 342, 343, 344, 350, 351
  Condensate 340
  Demand for natural gas liquids at plants and terminals 339–340
  Ethane 334–337, 340–352
  Foreign Trade 355
    Exports 355–356
    Imports 355
  Gasoline and naphtha 337, 340
  General summary 333
  Heavy products 339–340
  Isobutane 335, 340, 342, 344, 350–351
  Isopentane 337, 340, 352
  Liquefied petroleum gases shipments 344–351
  Liquefied refinery gases 341–342
  Natural gasoline 337, 352, 354
  Number of plant operators 337
  Number of plants 339
  Prices 354
  Production 336–339
  Propane 335–336, 340, 342–344, 350–351
  Reserves 335
  Salient statistics 334
  Scope of report 333
  Stocks 352
  Storage capacity 353–354
  Supply and distribution 340
  Types of plants 339
  Used in motor fuel 339
  Value at plants 337
Packaged fuel. See fuel briquets and packaged fuel.
Peat:
  Annual review 283
  Consumption 284, 289
  Destination of shipments 291
  Government regulations 285
  Imports 284, 295
  Injuries 51
  Production 6, 284, 290
    By kinds 290
    By States 290
    Value 6, 284, 290
    World 284, 299
  Reserves 287, 288

Page
Peat—Continued
  Sales 291, 292, 293
    Value 291, 292, 293
  Salient statistics 284
  Scope of report 285
  Technology 296
  Uses 289, 291
  World review 298
Pennsylvania anthracite:
  Annual review 159
  Competitive fuels 159, 194
  Consumption 8, 9, 10, 11, 12, 159, 160, 161, 162, 163, 192
    At cement mills 195
    At collieries 161, 174, 175, 195
    At oven-coke plants 162, 163, 195, 221, 223, 236
    At electric-utility plants 162, 163, 195
    By railroads 195
    In manufacturing briquets 195, 270
    In pelletizing and sintering 195
  Days worked, average 14, 161, 164, 188, 189
  Distribution 162, 163, 189, 190, 191
    By rail 162, 163, 192
    By truck 162, 163, 192, 193
    Coal year 191
  Earnings 162
  Employment 14, 15, 161, 164, 188, 189
  Energy 1, 3, 4, 7
  Equipment 180, 181, 182, 183
    Cutting machines 182
    Stripping 183
    Underground mechanical loading 180, 181
  Foreign trade 196, 197
    Exports 16, 162, 163, 196, 197
    Imports 161, 162, 163, 196, 197
  Hours worked 162–163
  Income originated 29
  Injuries 47–48
  Mine-water control 199
  Mining methods 166
  By undercutting machines 182
    Culmbank recovery 178
    Dredge 178
    Strip 176
    Underground 175
      Loading, hand 182
        Mechanical 180
  Output, per man-day 15, 161, 164, 189
    Per man-year 161, 164, 189
  Preparation 165
  Prices 183
    Retail 185
    Wholesale 162, 163
      Quoted 183
  Production 6, 159, 161, 162, 163, 166, 168, 169, 170, 171, 174, 175, 176
    By counties 175
    By dredge 179
    By fields 174, 175
    By months 180
    By regions 168, 169, 170, 171, 174, 176
  Production, by size 168, 169, 170, 171
    By weeks 180
    Culmbank 175, 176, 178
    Size, by percent of total 168, 169, 170, 171, 172, 173
    Strip 175, 176, 177, 182
    Underground 175, 176, 182
    Value of 161, 168, 169, 170, 171, 174, 175
    World 197, 198
  Receipts, lake dock 162, 163
    New England 162, 163
  Research 198
  Reserves 56–57
  Sales realization 23, 186, 187
  Shipments 162, 163
    By rail 162, 163, 169, 170, 171, 172, 174, 175, 192
    By truck 162, 163, 169, 170, 171, 172, 174, 175, 192, 193
  Stocks 13, 161, 162, 163, 195
  Value 161, 164, 168, 170, 174, 175
    Average 188
      By size 169, 171, 186, 187
    By size 168, 170
  Technology 198
    Mining 198
    Mine-water control 199
    Preparation 199
    Utilization 200
  World production 197, 198

UNITED STATES DEPARTMENT OF THE INTERIOR

Created in 1849, the Department of the Interior—America's Department of Natural Resources—is concerned with the management, conservation, and development of the Nation's water, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States—now and in the future.

○